Form No. 3372-793 Rev A

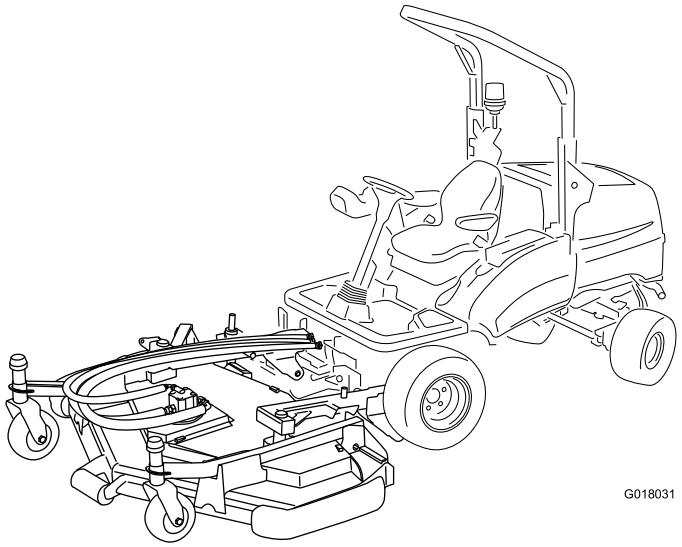
TORO®

Count on it.

Operator's Manual

Groundsmaster® 3400-D 4-Wheel Drive Traction Unit

Model No. 30651—Serial No. 312000001 and Up



G018031

To register your product or download an *Operator's Manual* or *Parts Catalog* at no charge, go to www.Toro.com.

Original Instructions (EN)

This product complies with all relevant European directives, for details please see the separate product specific Declaration of Conformity (DOC) sheet.

Introduction

This machine is a ride-on, rotary-blade lawn mower intended to be used by professional, hired operators in commercial applications. It is primarily designed for cutting grass on parks, sports fields, caravan parks, cemeteries and commercial grounds. It is not designed for cutting brush or for agricultural use.

Read this information carefully to learn how to operate and maintain your product properly and to avoid injury and product damage. You are responsible for operating the product properly and safely.

You may contact Toro directly for product and accessory information, help finding a dealer, or to register your product.

Whenever you need service, genuine Toro parts, or additional information, contact an Authorized Service Dealer or Toro Customer Service and have the model and serial numbers of your product ready. The model and serial numbers are on a plate mounted on the left side of the frame. Write the numbers in the space provided.

Model No. _____

Serial No. _____

This manual identifies potential hazards and has safety messages identified by the safety alert symbol (Figure 1), which signals a hazard that may cause serious injury or death if you do not follow the recommended precautions.

Figure 1

1. Safety alert symbol

This manual uses 2 other words to highlight information. **Important** calls attention to special mechanical information and **Note** emphasizes general information worthy of special attention.

8111 Lyndale Avenue South
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Safety

This machine meets or exceeds standard EN 836:1997 specifications in effect at time of production.

Improper use or maintenance by the operator or owner can result in injury. To reduce the potential for injury, comply with these safety instructions and always pay attention to the safety alert symbol, which means Caution, Warning, or Danger—personal safety instruction. Failure to comply with the instruction may result in personal injury or death.

Safe Operating Practices

The following instructions are from the standard EN 836:1997.

Training

- Read the operator's manual and other training material carefully. Be familiar with the controls, safety signs, and the proper use of the equipment.
- Never allow children or people unfamiliar with these instructions to use or service the mower. Local regulations may restrict the age of the operator.
- Never mow while people, especially children, or pets are nearby.
- Keep in mind that the operator or user is responsible for accidents or hazards occurring to other people or their property.
- Do not carry passengers.
- All drivers and mechanics should seek and obtain professional and practical instruction. The owner is responsible for training the users. Such instruction should emphasize:
  - the need for care and concentration when working with ride-on machines;
  - control of a ride-on machine sliding on a slope will not be regained by the application of the brake. The main reasons for loss of control are:
    - ◊ insufficient wheel grip;
    - ◊ being driven too fast;
    - ◊ inadequate braking;
    - ◊ the type of machine is unsuitable for its task;
    - ◊ lack of awareness of the effect of ground conditions, especially slopes;
- The owner/user can prevent and is responsible for accidents or injuries occurring to himself or herself, other people, or property.

Preparation

- While mowing, always wear substantial footwear, long trousers, hard hat, safety glasses, and ear protection. Long hair, loose clothing, or jewelry may get tangled in moving parts. Do not operate the equipment when barefoot or wearing open sandals.
- Thoroughly inspect the area where the equipment is to be used and remove all objects which may be thrown by the machine.
- **Warning**—Fuel is highly flammable. Take the following precautions:
  - Store fuel in containers specifically designed for this purpose.
  - Refuel outdoors only and do not smoke while refuelling.
  - Add fuel before starting the engine. Never remove the cap of the fuel tank or add fuel while the engine is running or when the engine is hot.
  - If fuel is spilled, do not attempt to start the engine but move the machine away from the area of spillage and avoid creating any source of ignition until fuel vapors have dissipated.
  - Replace all fuel tanks and container caps securely.
- Replace faulty silencers/mufflers.
- Only use accessories and attachments approved by the manufacturer.
- Before using, always visually inspect to see that the blades, blade bolts and cutter assembly are not worn or damaged. Replace worn or damaged blades and bolts in sets to preserve balance.
- Always make sure that the folding R.O.P.S is secured in its vertical operating position before use.
- On multi-bladed machines, take care as rotating one blade can cause other blades to rotate.
- Check that the operator's presence controls, safety switches and shields are attached and functioning properly. Do not operate unless they are functioning properly.

Operation

- Do not operate the engine in a confined space where dangerous carbon monoxide fumes can collect.
- Mow only in daylight or in good artificial light.
- Before attempting to start the engine, engage the parking brake, disengage the cutting unit drive system and ensure that the forward/reverse speed controls are in the neutral position.
- Do not use on a slope of more than 16 degrees. Care should be taken when using the mower on any slope

where ground conditions are such that there may be a risk of the mower rolling over. The requirements of 89/355/EEC, as amended by 95/63/EEC 'Provision and Use of Work Equipment Directive' should be considered.

- Remember there is no such thing as a safe slope. Travel on grass slopes requires particular care. To guard against overturning:
  - do not stop or start suddenly when going up or downhill;
  - machine speeds should be kept low on slopes and during tight turns;
  - stay alert for humps and hollows and other hidden hazards;
  - Do not turn sharply. Use care when reversing.
- Stay alert for holes in the terrain and other hidden hazards.
- Watch out for traffic when crossing or near roadways.
- Stop the blades rotating before crossing surfaces other than grass.
- When using any attachments, never direct discharge of material toward bystanders nor allow anyone near the machine while in operation.
- Never operate the machine with damaged guards, shields, or without safety protective devices in place. Be sure all interlocks are attached, adjusted properly, and functioning properly.
- Do not change the engine governor settings or over-speed the engine. Operating the engine at excessive speed may increase the hazard of personal injury.
- Before leaving the operator's position:
  - stop on level ground;
  - disengage the drive to the attachment,
  - lower the attachment to the ground;
  - Ensure the transmission is in neutral and engage the parking brake;
  - stop the engine and remove the key.
- When transporting the mower:
  - disengage the drive to the cutting unit,
  - raise the cutting unit to the transport position.
- Stop the engine and disengage drive to the cutting unit:
  - before refuelling;
  - before making height adjustment unless adjustment can be made from the operator's position.
  - before clearing blockages;
  - before checking, cleaning or working on the mower;
  - after striking a foreign object or if an abnormal vibration occurs. Inspect the mower for damage and make repairs before restarting and operating the equipment.
- Reduce the throttle setting during engine run-out and, if the engine is provided with a shut-off valve, turn the fuel off at the conclusion of mowing.
- Keep hands and feet away from the cutting units.
- Look behind and down before backing up to be sure of a clear path.
- Always wear the seat belt when the folding R.O.P.S is in its vertical operating position.
- Never wear the seat belt when the folding R.O.P.S is NOT in its vertical operating position.
- Slow down and use caution when making turns and crossing roads and sidewalks. Stop cutting unit if not mowing.
- Do not operate the mower under the influence of alcohol or drugs.
- Lightning can cause severe injury or death. If lightning is seen or thunder is heard in the area, do not operate the machine; seek shelter.
- Use care when loading or unloading the machine into a trailer or truck.
- Use care when approaching blind corners, shrubs, trees, or other objects that may obscure vision.

Maintenance and Storage

- Keep all nuts, bolts and screws tight to be sure the equipment is in safe working condition.
- Never store the equipment with fuel in the tank inside a building where fumes may reach an open flame or spark.
- Allow the engine to cool before storing in any enclosure.
- To reduce the fire hazard, keep the engine, silencer/muffler, battery compartment and fuel storage area free of grass, leaves, or excessive grease.
- Keep all parts in good working condition and all hardware and hydraulic fittings tightened. Replace all worn or damaged parts and decals.
- If the fuel tank has to be drained, do this outdoors.
- Be careful during adjustment of the machine to prevent entrapment of the fingers between moving blades and fixed parts of the machine.
- Disengage drives, lower the cutting units, set parking brake, stop engine and remove key from ignition.

Wait for all movement to stop before adjusting, cleaning or repairing.

- Clean grass and debris from cutting units, drives, silencers/mufflers, and engine to help prevent fires. Clean up oil or fuel spillage.
- Use jack stands to support components when required.
- Carefully release pressure from components with stored energy.
- Disconnect battery before making any repairs. Disconnect the negative terminal first and the positive last. Reconnect positive first and negative last.
- Use care when checking the blades. Wear gloves and use caution when servicing them. Only replace blades. Never straighten or weld them.
- Keep hands and feet away from moving parts. If possible, do not make adjustments with the engine running.
- Charge batteries in an open well ventilated area, away from spark and flames. Unplug charger before connecting or disconnecting from battery. Wear protective clothing and use insulated tools.

Toro Riding Mower Safety

The following list contains safety information specific to Toro products or other safety information that you must know that is not included in the safety standards.

This product is capable of amputating hands and feet and throwing objects. Always follow all safety instructions to avoid serious injury or death.

Use of this product for purposes other than its intended use could prove dangerous to user and bystanders.

⚠ WARNING

Engine exhaust contains carbon monoxide, which is an odorless, deadly poison that can kill you.

Do not run engine indoors or in an enclosed area.

- Know how to stop the engine quickly.
- Do not operate the machine while wearing tennis shoes or sneakers.
- Wearing safety shoes is advisable and required by some local ordinances and insurance regulations.
- Handle fuel carefully. Wipe up any spills.
- Check the safety interlock switches daily for proper operation. If a switch should fail, replace the switch before operating the machine.
- Before starting the engine, sit on the seat.
- Using the machine demands attention. To prevent loss of control:
  - Do not drive close to sand traps, ditches, creeks, or other hazards.
  - Reduce speed when making sharp turns. Avoid sudden stops and starts.
  - When near or crossing roads, always yield the right-of-way.
  - Apply the service brakes when going downhill to keep forward speed slow and to maintain control of the machine.
- Raise the cutting units when driving from one work area to another.
- Do not touch the engine, silencer/muffler, or exhaust pipe while the engine is running or soon after it has stopped because these areas could be hot enough to cause burns.
- If the engine stalls or loses headway and cannot make it to the top of a slope, do not turn the machine around. Always back slowly, straight down the slope.
- When a person or pet appears unexpectedly in or near the mowing area, stop mowing. Careless operation, combined with terrain angles, ricochets, or improperly positioned guards can lead to thrown object injuries. Do not resume mowing until the area is cleared.

Maintenance and Storage

- Make sure all hydraulic line connectors are tight and all hydraulic hoses and lines are in good condition before applying pressure to the system.
- Keep your body and hands away from pin hole leaks or nozzles that eject hydraulic fluid under high pressure. Use paper or cardboard, not your hands, to search for leaks. Hydraulic fluid escaping under pressure can have sufficient force to penetrate the skin and cause serious injury. Seek immediate medical attention if fluid is injected into skin.
- Before disconnecting or performing any work on the hydraulic system, all pressure in the system must be relieved by stopping the engine and lowering the cutting units and attachments to the ground.
- Check all fuel lines for tightness and wear on a regular basis. Tighten or repair them as needed.
- If the engine must be running to perform a maintenance adjustment, keep hands, feet, clothing, and any parts of the body away from the cutting units, attachments, and any moving parts. Keep everyone away.

- To ensure safety and accuracy, have an Authorized Toro Distributor check the maximum engine speed with a tachometer. Maximum governed engine speed should be 3000 RPM.
- If major repairs are ever needed or if assistance is desired, contact an Authorized Toro Distributor.
- Use only Toro-approved attachments and replacement parts. The warranty may be voided if used with unapproved attachments.

Sound Power Level

Model 30651 + 30645

This unit has a guaranteed sound power level of 104 dBA, which includes an Uncertainty Value (K) of 2 dBA. Sound power level was determined according to the procedures outlined in ISO 11094.

Model 30651 + 30646

This unit has a guaranteed sound power level of 105 dBA, which includes an Uncertainty Value (K) of 2 dBA. Sound power level was determined according to the procedures outlined in ISO 11094.

Sound Pressure Level

Model 30651 + 30645

This unit has a sound pressure level at the operator's ear of 93 dBA, which includes an Uncertainty Value (K) of 2 dBA. Sound pressure level was determined according to the procedures outlined in EN 836

Model 30651 + 30646

This unit has a sound pressure level at the operator's ear of 94 dBA, which includes an Uncertainty Value (K) of 2 dBA. Sound pressure level was determined according to the procedures outlined in EN 836.

Vibration Level

Model 30651 + 30645

Hand-Arm

Measured vibration level for right hand = 1.5 m/s^2

Uncertainty Value (K) = 0.8 m/s^2

Measured vibration level for left hand = 1.0 m/s^2

Uncertainty Value (K) = 0.5 m/s^2

Measured values were determined according to the procedures outlined in EN 836.

Whole Body

Measured vibration level = 0.5 m/s^2

Uncertainty Value (K) = 0.3 m/s^2

Measured values were determined according to the procedures outlined in EN 836.

Model 30651 + 30646

Hand-Arm

Measured vibration level for right hand = 1.5 m/s^2

Uncertainty Value (K) = 0.8 m/s^2

Measured vibration level for left hand = 1.0 m/s^2

Uncertainty Value (K) = 0.5 m/s^2

Measured values were determined according to the procedures outlined in EN 836.

Whole Body

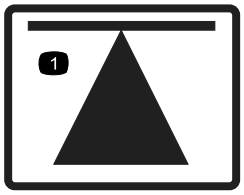
Measured vibration level = 0.5 m/s^2

Uncertainty Value (K) = 0.3 m/s^2

Measured values were determined according to the procedures outlined in EN 836.

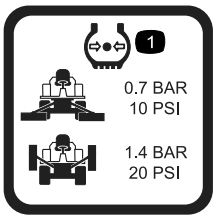
Safety and Instructional Decals

Safety decals and instructions are easily visible to the operator and are located near any area of potential danger. Replace any decal that is damaged or lost.



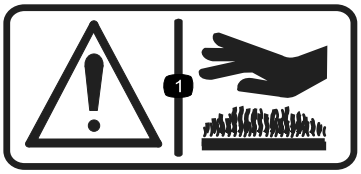
70-13-072

1. Jacking point



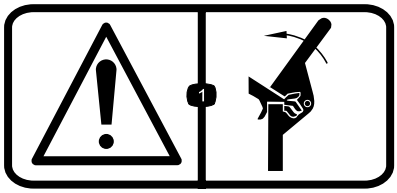
950832

1. Tire pressure



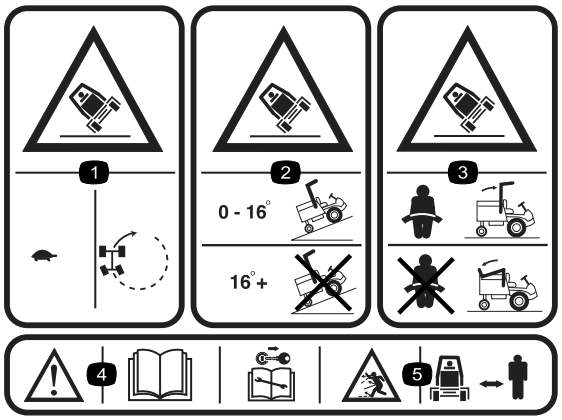
950889

1. Warning—hot surfaces.



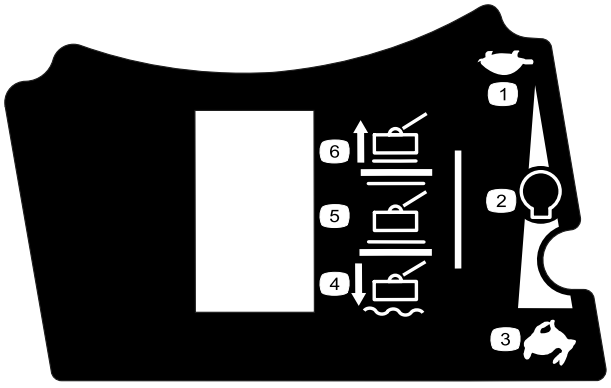
111-0773

1. Warning—crushing of fingers, force applied from side.



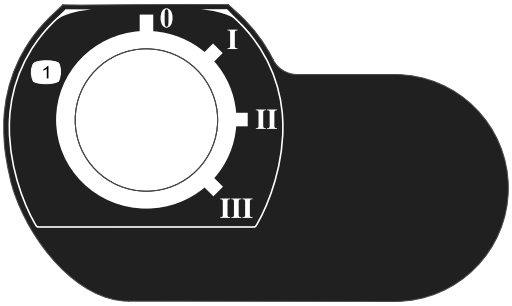
111-0936

1. Tipping hazard—slow machine before turning.
2. Tipping hazard—operate on slopes less than 16 degrees, do not operate on slopes greater than 16 degrees.
3. Tipping hazard—always wear the seat belt when a roll over protection system (ROPS) is in use, do not wear a seat belt when the ROPS bar is lowered.
4. Warning—read the *Operator's Manual*, remove the ignition key before performing any maintenance.
5. Thrown object hazard—keep bystanders a safe distance from the machine.



111–5233

1. Slow
2. Continuous variable engine speed
3. Fast
4. Raise the cutting unit
5. Neutral cutting unit
6. Float the cutting unit over the ground

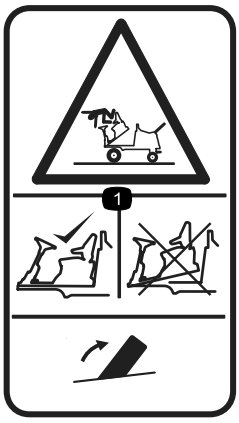


111-3344

1. Ignition switch

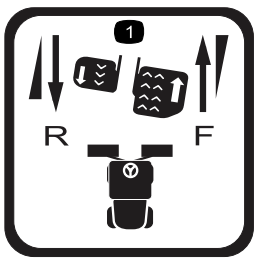
111-3562

1. Press pedal to adjust steering wheel tilt.



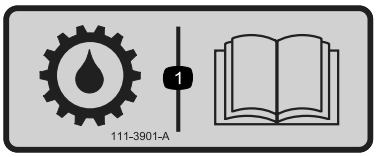
111-3566

1. Falling, crushing hazard—ensure platform latch in engaged before operating.



111-3567

1. Pedal operation



111-3901

1. Transmission oil—read the *Operator's Manual* for more information.

111-3902

1. Warning—cutting hazard of hand, fan.
2. Hot surfaces—read the *Operator's Manual* for more information.

Setup

Loose Parts

Use the chart below to verify that all parts have been shipped.

Procedure	Description	Qty.	Use
1	Tire pressure gauge (not supplied)	1	Check the tire pressure.
2	Operator's Manual Engine Operator's Manual Parts Catalog CE certificate	1 1 1 1	Read the Operator's Manual before operating the machine.

Note: Determine the left and right sides of the machine from the normal operating position.

1

Checking the Tire Pressure

Parts needed for this procedure:

1	Tire pressure gauge (not supplied)

Procedure

Correct air pressure in the front and rear tires. See the chart below for the correct pressure.

Important: Maintain correct tire pressures in all tires to ensure correct contact with the turf.

Tires	Tire Type	Recommended Tire Pressures		
		Turf Conditions	Road Conditions	Max Pressure
Front Axle	26 x 12.00 - 12 BKT turf pattern	10 psi (0.7 bar)	20 psi (1.4 bar)	25 psi (1.7 bar)
Rear Axle	20 x 10.00 - 8 6 BKT turf pattern	10 psi (0.7 bar)	20 psi (1.4 bar)	25 psi (1.7 bar)

2

Reading the Manual

Parts needed for this procedure:

1	*Operator's Manual*
1	*Engine Operator's Manual*
1	*Parts Catalog*
1	CE certificate

Procedure

- Read the *Operator's Manual*.
- Store all documentation in a safe place for future use.

Product Overview

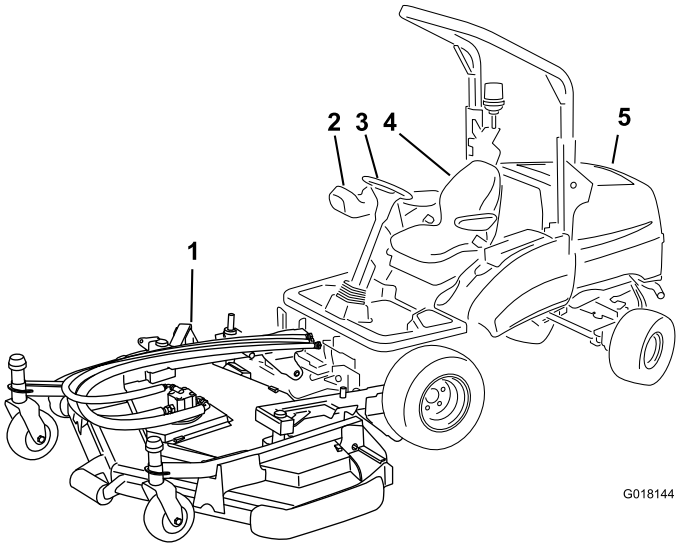


Figure 2

1. Cutting unit
2. Control arm
3. Steering wheel
4. Operator's seat
5. Hood

Controls

Control Panel Components

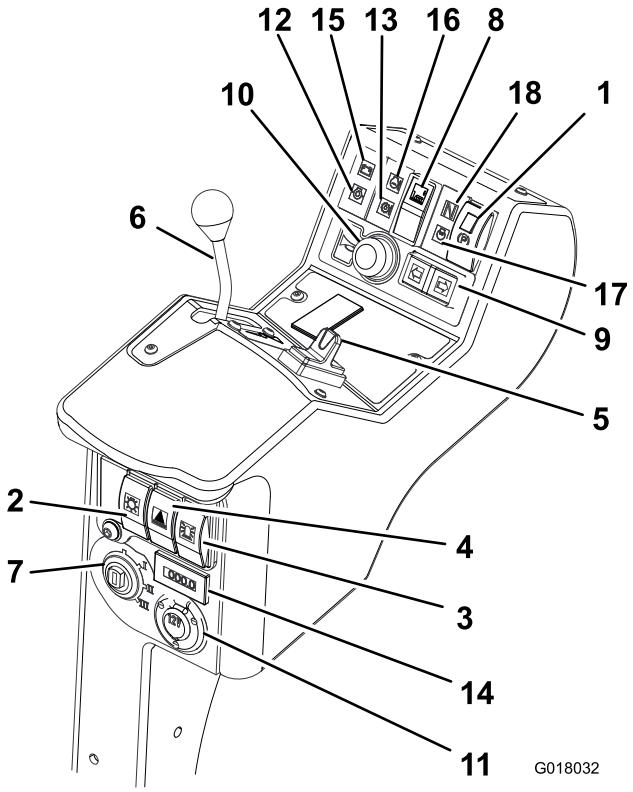


Figure 3

1. Parking brake switch
2. Light switch (supplied with light kit)
3. Warning beacon switch (supplied with beacon kit)
4. Hazard warning switch (supplied with lighting kit)
5. Cutting unit position control
6. Throttle control lever
7. Ignition switch
8. Cutting unit drive switch
9. Direction indicator switch (supplied with lighting kit)
10. Horn button (supplied with light kit)
11. Auxiliary 12 volt socket (supplied with a 12V kit)
12. Oil pressure indicator
13. Transmission temperature indicator
14. Hour meter
15. Battery warning indicator
16. Engine temperature warning indicator
17. Glow plug indicator
18. Transmission neutral indicator

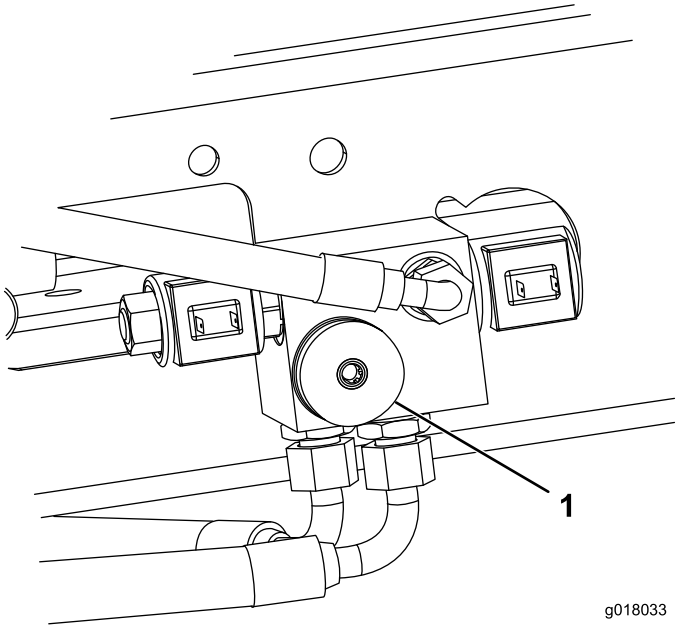


Figure 4

1. Weight transfer control

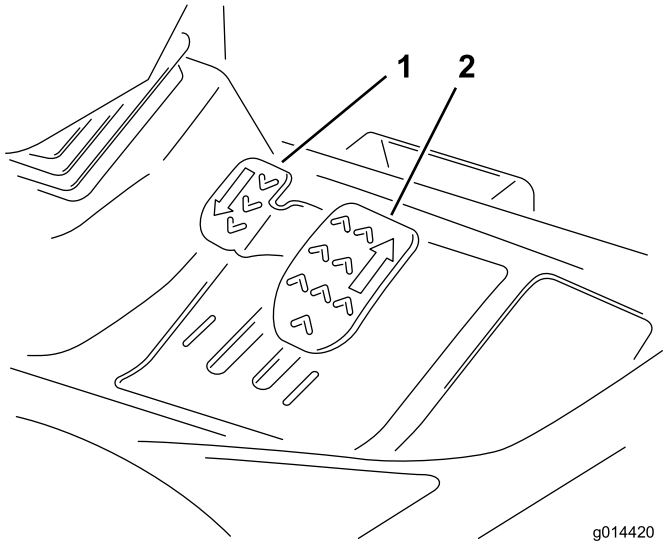


Figure 5

1. Reverse travel pedal
2. Forward travel pedal

Braking System

Parking Brake

Move the parking brake switch to its forward position by depressing the smaller locking button and moving the switch forward to engage the parking brake (Figure 6).

Note: Do not operate the mower with the parking brake engaged and do not engage the parking brake while the mower is moving.

This light illuminates when the parking brake is engaged and the ignition key is turned to position **I**.

⚠ WARNING

The parking brake operates on the front wheels only. Do not park the mower on a slope.

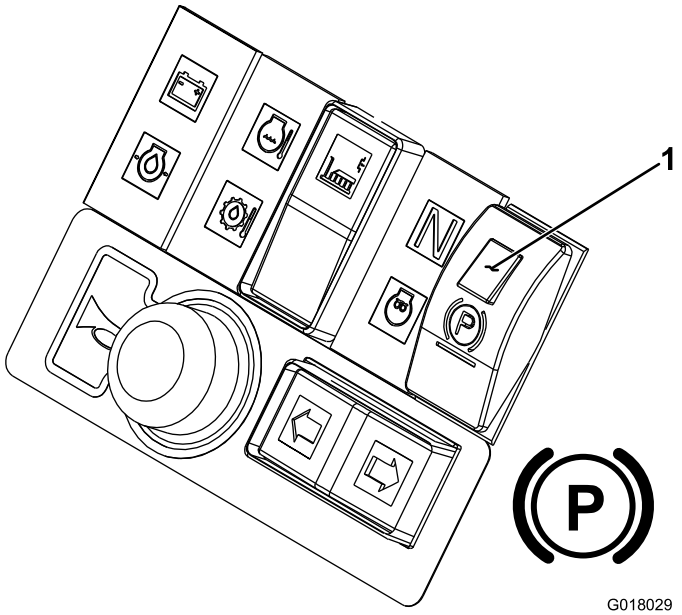


Figure 6

1. Parking brake

Service Brake

Service braking is achieved by the hydraulic transmission system. When the forward or reverse travel pedals are released or the engine speed reduced, service braking becomes effective and travel speed is automatically reduced. To increase the braking effect, push the transmission pedal into the neutral position. Service braking is effective on the front wheels only.

⚠ WARNING

The service braking system will not hold the mower at a standstill. ALWAYS ensure the parking brake is engaged to park the mower at a standstill.

Emergency Brake

In the event of service brake failure, turn the ignition off to bring the mower to a stand still.

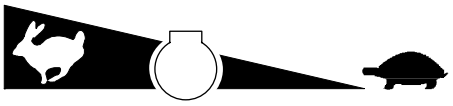
⚠ WARNING

Take care when using the emergency braking. Remain seated and hold on to the steering wheel to prevent ejection from the mower caused by the front wheel brakes being applied suddenly when travelling.

Throttle Control

Operate the throttle control in a forward direction to increase the engine speed. Operate the throttle control in a rearward direction to reduce engine speed (Figure 7).

Note: The engine speed dictates the speed of the other functions, i.e. travel, cutting blade rotation speed and cutting unit lift speed.



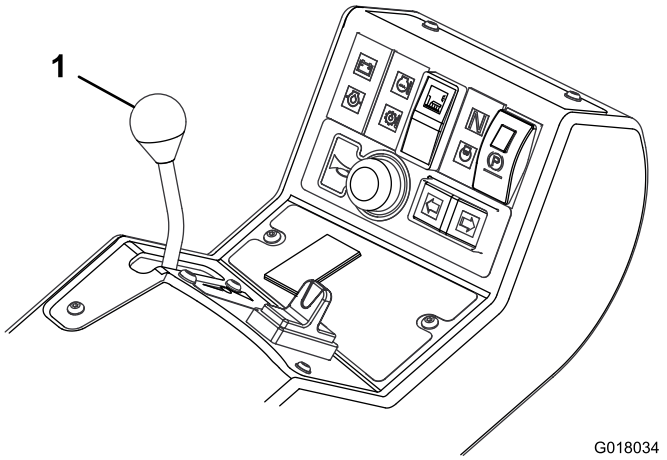


Figure 7

1. Throttle control

Travel

Forward travel: Depress the forward travel pedal to increase forward travel speed. Release the pedal to reduce speed (Figure 8).

Reverse travel: Depress the reverse travel pedal to increase reverse travel speed. Release the pedal to reduce speed (Figure 8).

Stop (Neutral): Release the forward or reverse travel pedal.

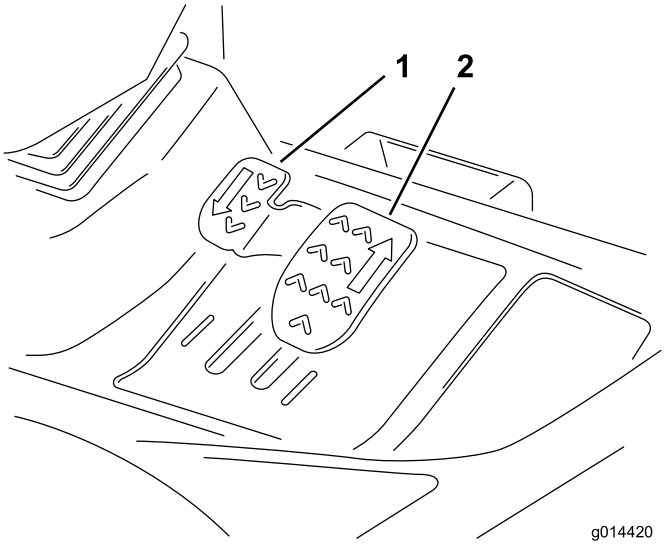


Figure 8

1. Reverse travel pedal
2. Forward travel pedal

Cutting Unit Drive Switch

Always put the cutting unit drive switch in the **Off** position when travelling between work areas.

Adjustable Steering Column

⚠ WARNING

Never operate the mower without first checking that the steering column adjuster mechanism is in good working order and that, once adjusted and locked, the steering wheel remains securely in position.

Adjustment of the steering wheel and steering column should only be carried out when the mower is at a standstill with the parking brake engaged.

1. To tilt the steering wheel, press the foot pedal down.
2. Position the steering tower to the most comfortable position and release the pedal (Figure 9).

Figure 9

Operator Seat

⚠ WARNING

Never operate the mower without first checking that the operator seat mechanisms are in good working order and that, once adjusted and locked, the seat remains securely in position.

Adjustment of the seat mechanisms should only be carried out when the mower is at a standstill with the parking brake engaged.

.**Fore/Aft Adjustment:** The seat adjusting lever allows you to adjust the seat fore and aft (Figure 10).

Operator weight adjustment: Rotate the handle clockwise, as shown, to increase suspension stiffness and counter-clockwise to decrease (Figure 10).

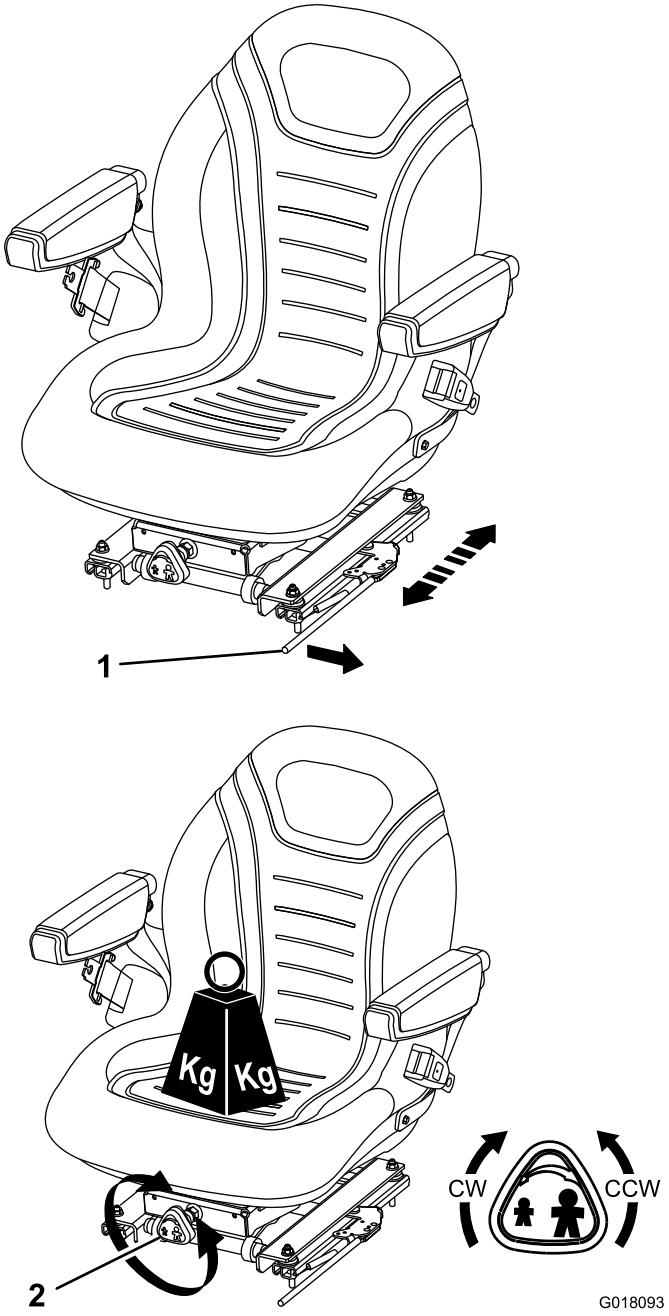


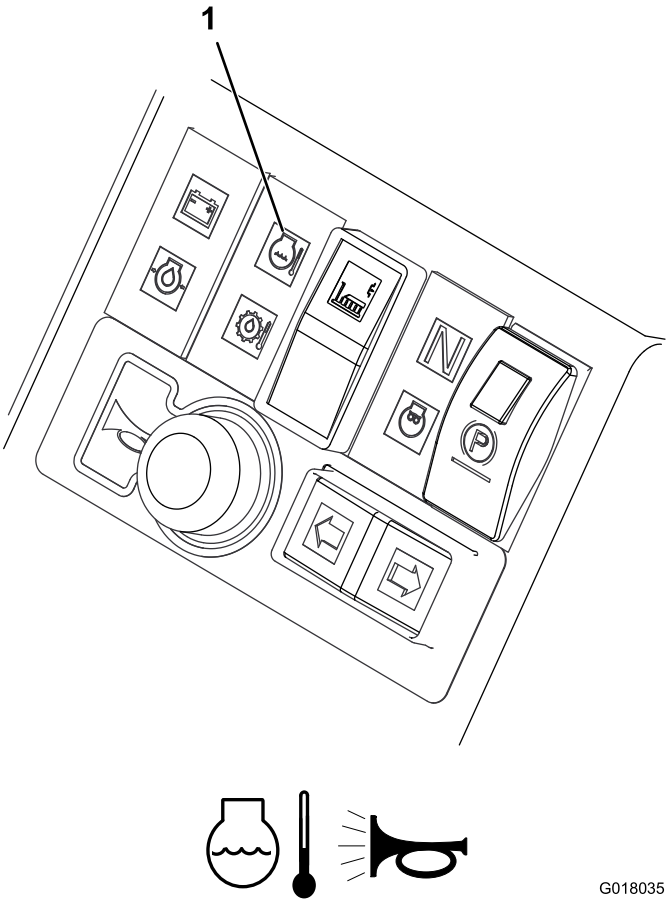
Figure 10

1. Seat adjustment lever
2. Operator weight handle

Warning Systems

Engine Coolant Overheating Warning Light

The engine coolant warning light illuminates and the horn is actuated (Figure 11).



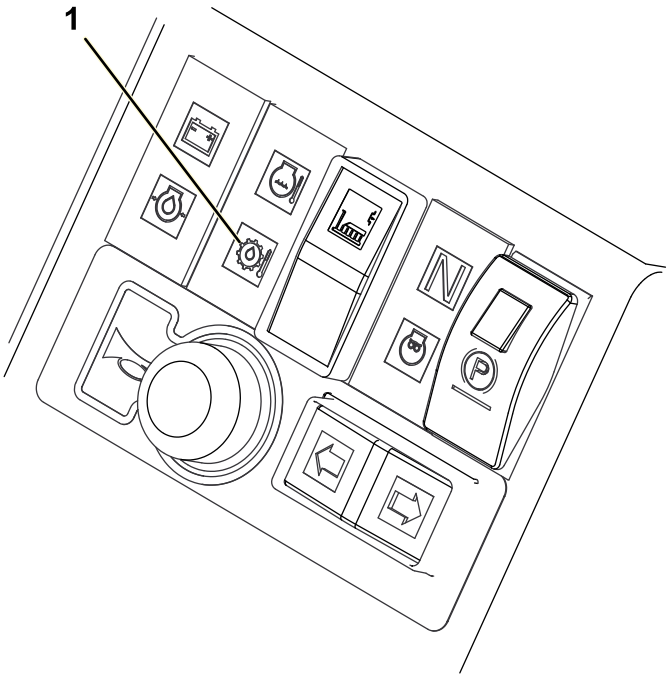
G018035

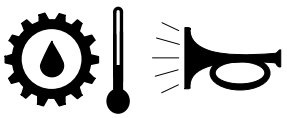
Figure 11

1. Engine coolant overheating warning light

Hydraulic Oil Overheating Warning Light

The hydraulic oil warning light illuminates when overheating occurs and the horn is actuated when the hydraulic oil in the reservoir exceeds 203 degrees F (95 degrees C) (Figure 12).





G018036

Figure 12

1. Hydraulic oil overheating warning light

Low Battery Charge Warning Light

The battery charge warning light illuminates when low battery charge occurs (Figure 13).

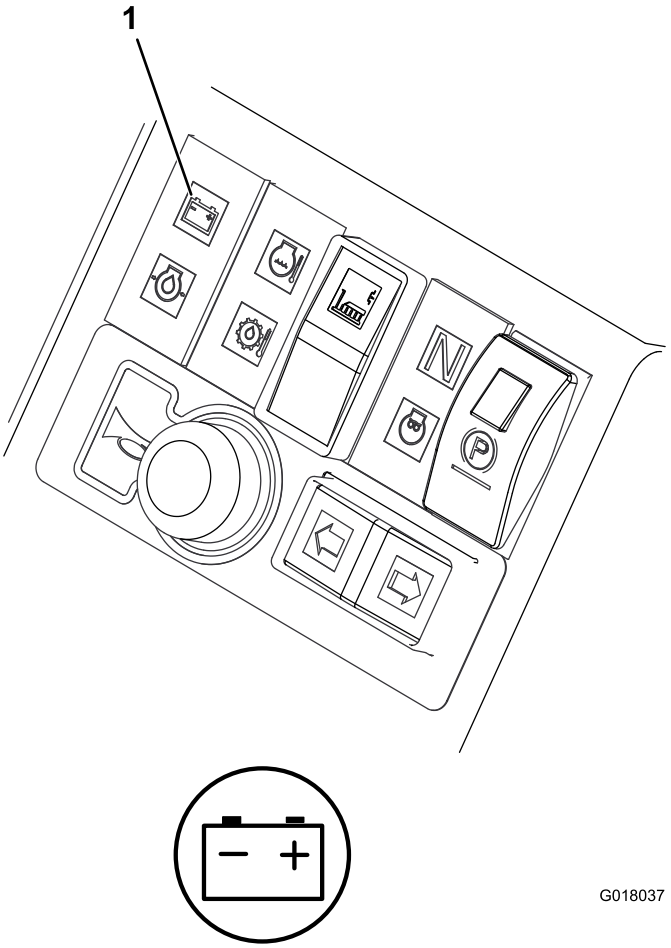


Figure 13

1. Low battery charge warning light

Low Engine Oil Pressure Warning Light

The engine oil pressure warning light illuminates when the oil pressure is too low (Figure 14).

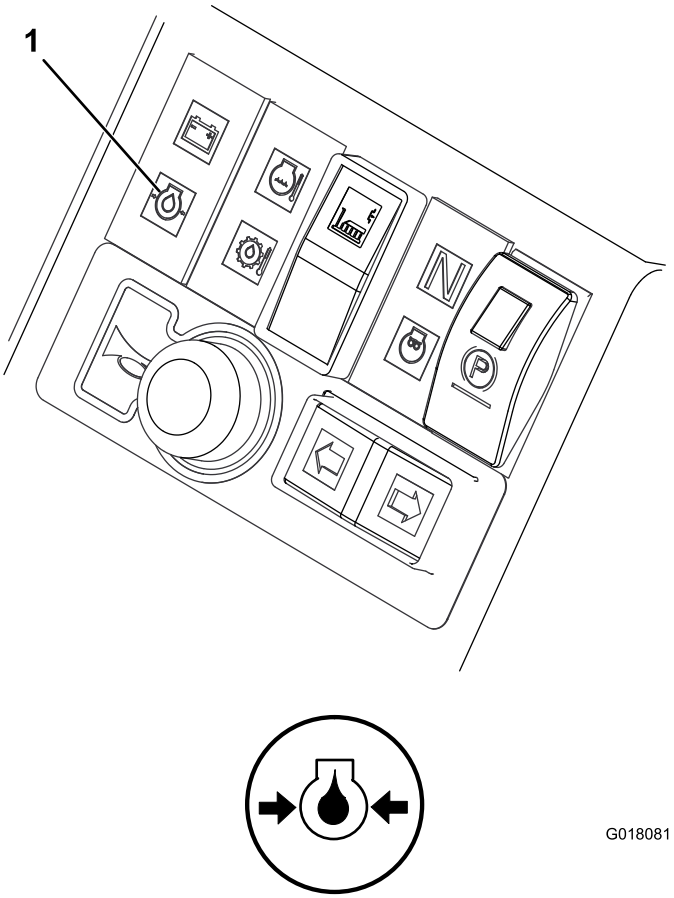


Figure 14

1. Low engine oil pressure warning light

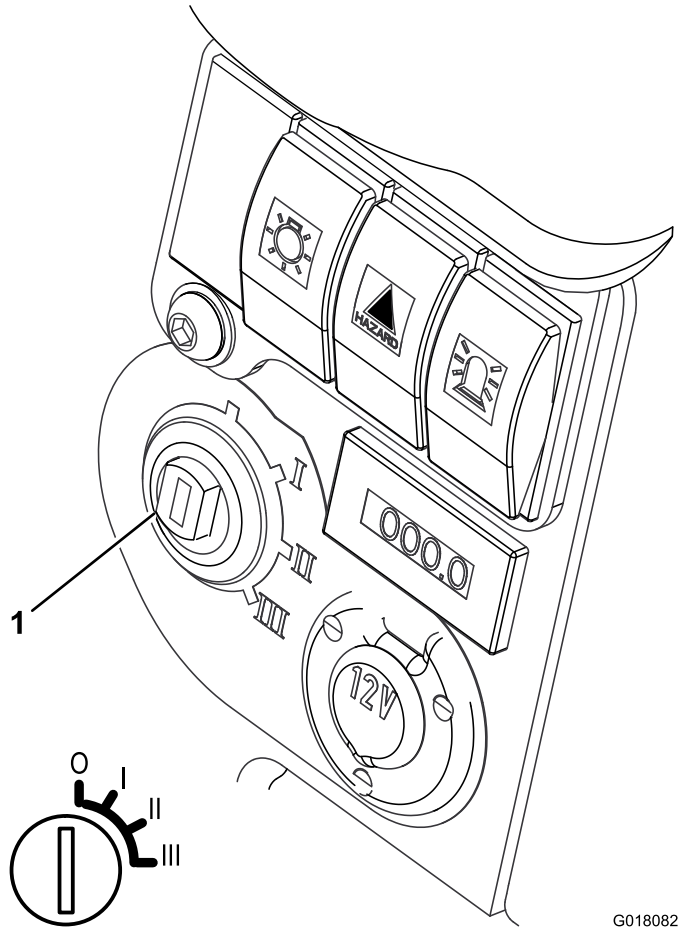
Ignition Key

0 = Engine off.
I = Engine run/Auxiliary on.
II = Engine pre-heat.
III = Engine start.

⚠ WARNING

Always remove the ignition key when the mower is not in use.

Important: Always install the protective cap when the ignition key is removed to prevent ingress of dirt and moisture and damaging the mechanism.



G018082

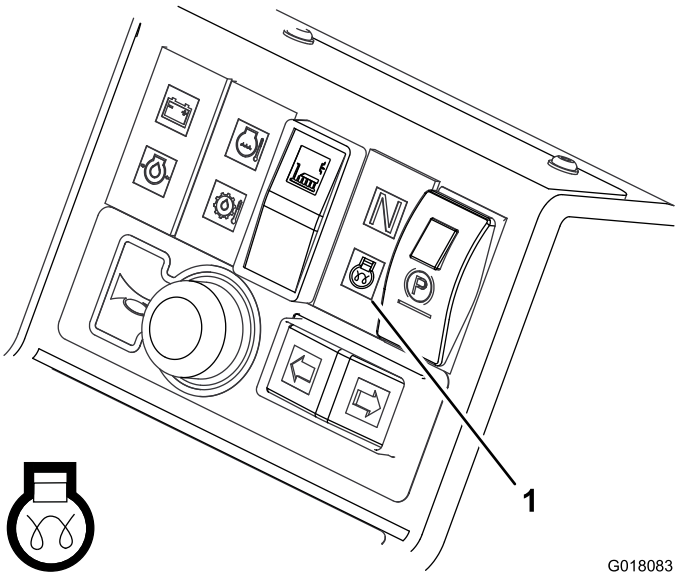
Figure 15

1. Ignition switch

Engine Pre-Heat Indicator Light

Turn the ignition key to position **II**. The engine preheat indicator light will illuminate and heat the glow plugs (Figure 16).

Important: Attempting to start a cold engine before the pre-heat is used can cause unnecessary wear to the battery.



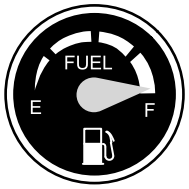
G018083

Figure 16

1. Engine pre-heat indicator light

Fuel Gauge

The fuel gauge shows the amount of fuel in the tank (Figure 17).

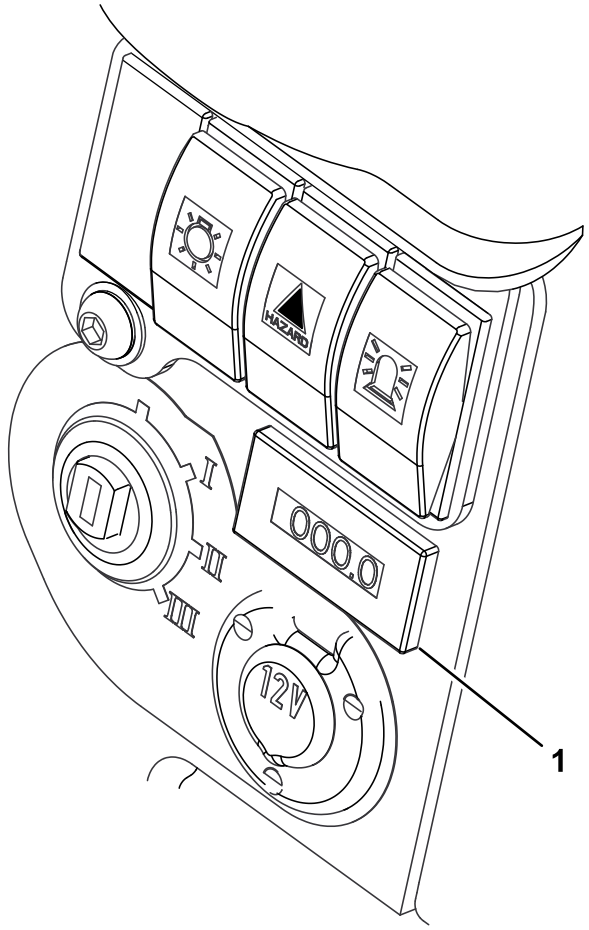


G014558

Figure 17

Hour Meter

The hour meter shows the total hours that the machine has been operated (Figure 18).



G018084

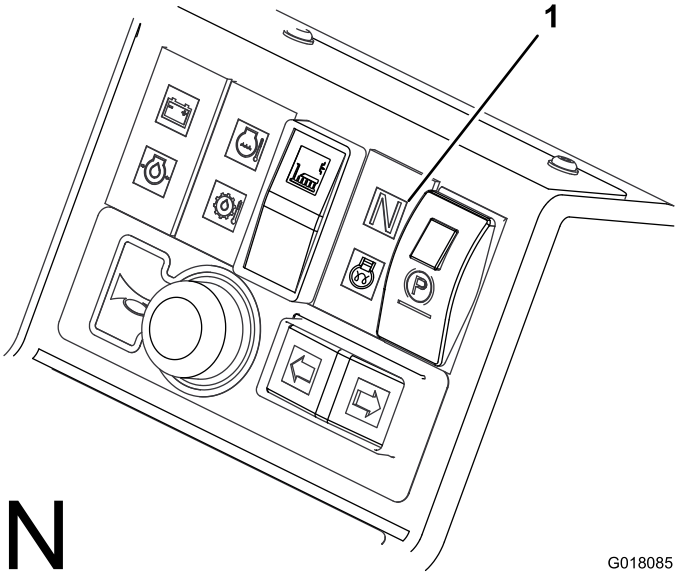
Figure 18

1. Hour meter

Transmission Neutral Indicator Light

This light illuminates when the travel control pedal is in the neutral position and the ignition key is turned to position **I** (Figure 19).

Note: The parking brake must be engaged for the transmission neutral indicator light to illuminate.



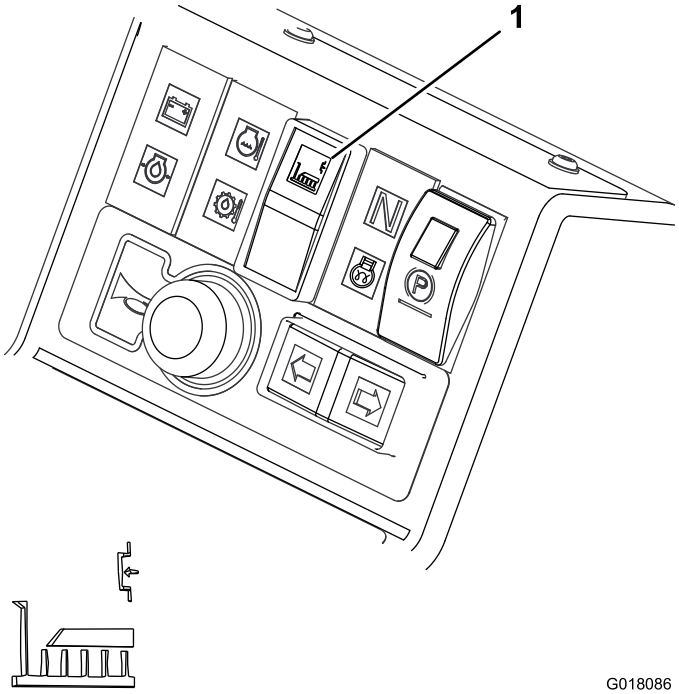
G018085

Figure 19

1. Transmission neutral indicator light

Cutting Unit Drive Switch Indicator Light

This light illuminates when the cutting unit drive switch is in the forward position and the ignition key is turned to position **I** (Figure 20).



G018086

Figure 20

1. Cutting Unit Drive Switch Indicator Light

Specifications

Note: Specifications and design are subject to change without notice.

Width	58.7 inches (1490 mm)
Length	94.9 inches (2410 mm)
Height	66.2 inches (1681 mm) with R.O.P.S. folded 92.9 inches (2360 mm) with R.O.P.S. in its vertical operating position
Weight (without cutting unit)	1940 lbs (880 kg)
Fuel tank capacity	12.1 gallons (45.7 litres)
Maximum forward speed	15.5 mph (25 km/h)
Maximum reverse speed	8 mph (12.5 km/h)
Hydraulic system capacity	7.04 UK Gallons (32 litres)

Attachments/Accessories

A selection of Toro approved attachments and accessories are available for use with the machine to enhance and expand its capabilities. Contact your Authorized Service Dealer or Distributor.

Operation

Note: Determine the left and right sides of the machine from the normal operating position.

⚠ CAUTION

If you leave the key in the ignition switch, someone could accidently start the engine and seriously injure you or other bystanders.

Lower the cutting units to the ground, set the parking brake and remove the key from the ignition switch before servicing or making adjustments to the machine.

Checking the Engine Oil Level

Service Interval: Before each use or daily

The engine is shipped with oil in the crankcase; however, the oil level must be checked before and after the engine is first started.

Crankcase capacity is approximately 203 ounces (6 litres) with the filter.

Use high-quality engine oil that meets the following specifications:

- API Classification Level Required: CH-4, CI-4 or higher
- Preferred oil: SAE 15W-40 (above 0 degrees F)
- Alternate oil: SAE 10W-30 or 5W-30 (all temperatures)

Toro Premium Engine oil is available from your distributor in either 15W-40 or 10W-30 viscosity.

Note: The best time to check the engine oil is when the engine is cool before it has been started for the day. If it has already been run, allow the oil to drain back down to the sump for at least 10 minutes before checking. If the oil level is at or below the **add** mark on the dipstick, add oil to bring the oil level to the **full** mark. DO NOT OVERFILL. If the oil level is between the **full** and **add** marks, no oil addition is required.

1. Park the machine on a level surface, stop the engine, set the parking brake and remove the key from the ignition switch.
2. Open the hood.
3. Remove the dipstick, wipe it clean, and install it (Figure 21).

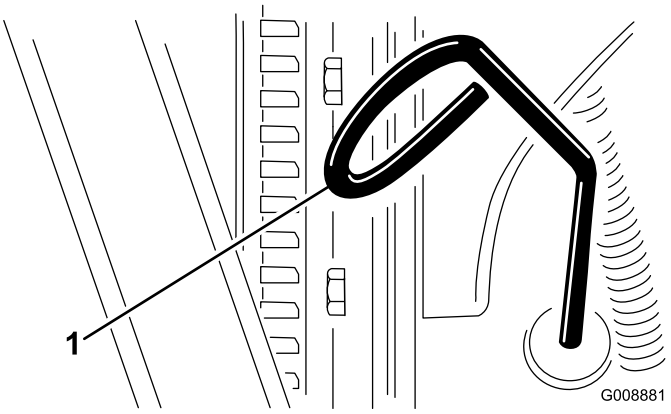


Figure 21

1. Dipstick

4. Remove dipstick and check oil level on dipstick. The oil level should be up to the Full mark.
5. If the oil level is below the Full mark, remove the fill cap (Figure 22) and add oil until level reaches the Full mark on dipstick. **Do not overfill.**

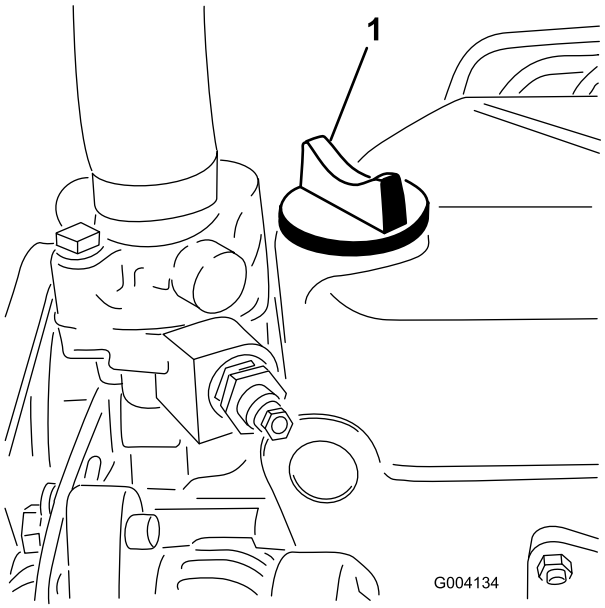


Figure 22

1. Oil fill cap

6. Install the oil fill cap and close the hood.

Checking the Cooling System

Service Interval: Before each use or daily

⚠ CAUTION

If the engine has been running, the pressurized, hot coolant can escape and cause burns.

- **Allow the engine to cool down before opening the radiator cap.**
- **Do not open the radiator cap when the engine is running.**
- **Use a rag when opening the radiator cap, and open the cap slowly to allow steam to escape.**

The cooling system is filled with a 50/50 solution of water and permanent ethylene glycol antifreeze.

1. Clean debris off of the screen, oil cooler, and front of the radiator daily and more often if conditions are extremely dusty and dirty. Refer to the section on Removing Debris from the Cooling System in Maintenance.
2. Remove the cap from the radiator.
3. The coolant level needs to be 1.2-1.6 inches (30mm - 40mm) below the top of the filler neck.

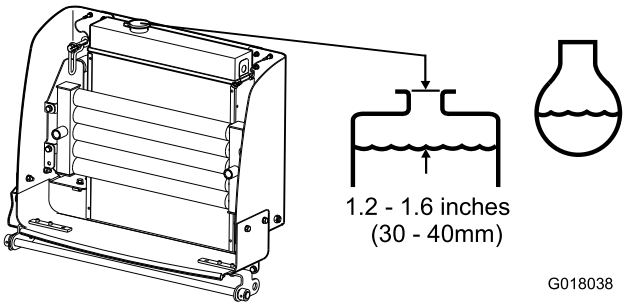


Figure 23

Adding Fuel

Service Interval: Before each use or daily

Use only clean, fresh diesel fuel with low (<501 ppm) or ultra low (<15 ppm) sulfur content. The minimum cetane rating should be 40. Purchase fuel in quantities that can be used within 180 days to ensure fuel freshness.

Fuel tank capacity:11 gallons (42 l)

Use summer grade diesel fuel (No. 2-D) at temperatures above 20° F (-7° C) and winter grade (No. 1-D or No. 1-D/2-D blend) below that temperature. Use of winter grade fuel at lower temperatures provides lower flash point and cold flow characteristics which will ease starting and reduce fuel filter plugging.

Use of summer grade fuel above 20° F (-7° C) will contribute toward longer fuel pump life and increased power compared to winter grade fuel.

Important: Do not use kerosene or gasoline instead of diesel fuel. This product is suitable for use with Biodiesel of up to B7. Failure to observe this caution will damage the engine.

⚠ WARNING

Fuel is harmful or fatal if swallowed. Long-term exposure to vapors can cause serious injury and illness.

- **Avoid prolonged breathing of vapors.**
- **Keep face away from nozzle and gas tank or conditioner opening.**
- **Keep fuel away from eyes and skin.**

⚠ DANGER

In certain conditions, fuel is extremely flammable and highly explosive. A fire or explosion from fuel can burn you and others and can damage property.

- **Fill the fuel tank outdoors, in an open area, when the engine is cold. Wipe up any fuel that spills.**
- **Never fill the fuel tank inside an enclosed trailer.**
- **Never smoke when handling fuel, and stay away from an open flame or where fuel fumes may be ignited by a spark.**
- **Store fuel in an approved container and keep it out of the reach of children. Never buy more than a 30-day supply of fuel.**
- **Do not operate without entire exhaust system in place and in proper working condition.**

⚠ DANGER

In certain conditions during fueling, static electricity can be released causing a spark which can ignite the fuel vapors. A fire or explosion from fuel can burn you and others and can damage property.

- **Always place fuel containers on the ground away from your vehicle before filling.**
- **Do not fill fuel containers inside a vehicle or on a truck or trailer bed because interior carpets or plastic truck bed liners may insulate the container and slow the loss of any static charge.**
- **When practical, remove equipment from the truck or trailer and refuel the equipment with its wheels on the ground.**
- **If this is not possible, then refuel such equipment on a truck or trailer from a portable container, rather than from a fuel dispenser nozzle.**
- **If a fuel dispenser nozzle must be used, keep the nozzle in contact with the rim of the fuel tank or container opening at all times until fueling is complete.**

1. Park the machine on a level surface.
2. Using a clean rag, clean the area around the fuel tank cap.
3. Remove the cap from the fuel tank.
4. Fill the tank until the level is to the bottom of the filler neck with diesel fuel.
5. Install the fuel tank cap tightly after filling the tank.

Note: If possible, fill the fuel tank after each use. This will minimize possible buildup of condensation inside the fuel tank.

Checking the Hydraulic Fluid

The machines reservoir is filled at the factory with approximately 7.04 UK gallons (32 l) of high quality hydraulic fluid. Check the level of the hydraulic fluid before the engine is first started and daily thereafter. The recommended replacement fluid is as follows:

Toro Premium All Season Hydraulic Fluid (Available in 5 gallon pails or 55 gallon drums. See parts catalog or Toro distributor for part numbers.)

Alternate fluids: If the Toro fluid is not available, other fluids may be used provided they meet all the following material properties and industry specifications. We do not recommend the use of synthetic fluid. Consult with your lubricant distributor to identify a satisfactory product Note: Toro will not assume responsibility for damage caused by improper substitutions, so use only products from reputable manufacturers who will stand behind their recommendation.

High Viscosity Index/Low Pour Point Anti-wear Hydraulic Fluid, ISO VG 46

Material Properties:

Viscosity, ASTM D445	cSt @ 40°C 44 to 48 cSt @ 100°C 7.9 to 8.5
Viscosity Index ASTM D2270	140 to 160
Pour Point, ASTM D97	-34°F to -49°F

Industry Specifications:

Vickers I-286-S (Quality Level), Vickers M-2950-S (Quality Level), Denison HF-0

Note: Many hydraulic fluids are almost colorless, making it difficult to spot leaks. A red dye additive for the hydraulic system oil is available in 2/3 oz. (20 ml) bottles. One bottle is sufficient for 15-22 1 (4-6 gal) of hydraulic oil. Order part no. 44-2500 from your authorized Toro distributor.

Biodegradable Hydraulic Fluid - Mobil 224H

Toro Biodegradable Hydraulic Fluid (Available in 5 gallon pails or 55 gallon drums. See parts catalog or Toro distributor for part numbers.)
Alternate fluid: Mobil EAL 224H

Note: This is vegetable-oil based biodegradable oil tested and approved by Toro for this model. This fluid is not as resistant to high temperatures as standard fluid, so be sure to follow the recommended fluid change intervals with this fluid. Contamination by mineral-based hydraulic fluids will change the biodegradability and toxicity of this oil. When changing from standard fluid to the biodegradable type, be certain to follow the approved flushing procedure. Contact your local Toro Distributor for details.

1. Position machine on a level surface, lower the cutting units and stop the engine.
2. Check the sight level gauge on the side of the tank. The level needs to be at the upper mark.
3. If hydraulic oil is needed, clean area around the cap of hydraulic tank (Figure 24). Remove cap from the tank.

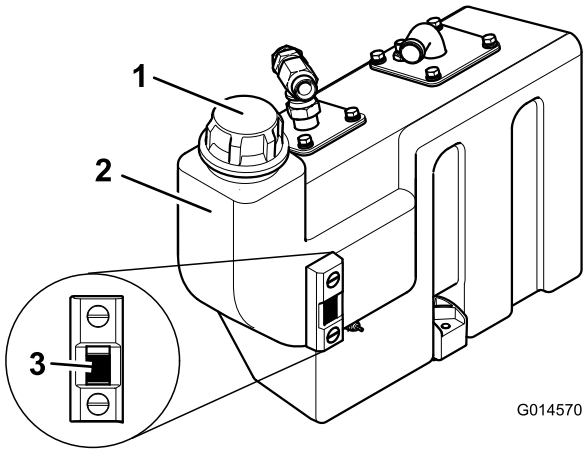


Figure 24

1. Hydraulic tank cap
2. Oil tank
3. Sight level gauge

4. Remove the cap and fill the tank to the upper mark on the sight level gauge. Do not overfill.
5. Install the cap onto the tank.

Check the Torque of the Wheel Nuts

Service Interval: Before each use or daily

Torque the wheel nuts to 148 ft-lb (200 N-m) for the front axle, and 40 ft-lb (54 N-m) for the rear axle.

⚠ WARNING

Failure to maintain proper torque of the wheel nuts could result in personal injury.

Operator Platform Latching Mechanism

Do not operate the mower without first checking that the operator platform latching mechanism is fully engaged and in good working order.

⚠ WARNING

Never operate the mower without first checking that the operator platform latching mechanism is fully engaged and in good working order.

Releasing the Platform

1. Move the locking latch handle towards the front of the mower until the latch hooks clear the locking bar.
2. Raise the platform. The gas spring will provide assistance.

Securing the Platform

1. Lower the platform carefully. The gas spring will provide assistance.
2. Move the locking latch handle towards the front of the mower as the platform nears the fully lowered position. This will ensure that the latch hooks clear the locking bar.
3. Fully lower the platform and move the locking handle towards the rear of the mower until the latch hooks fully engage the locking bar.

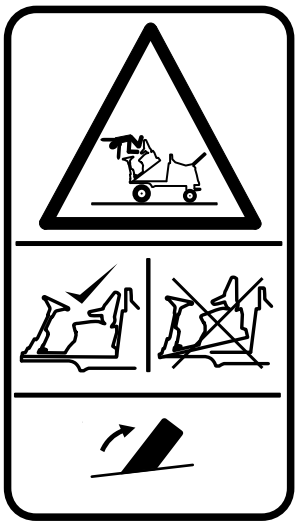


Figure 25

Operator Presence Control

Note: The engine will cut out if the operator leaves the seat without engaging the parking brake.

Engine Start Lockout: The engine can only be started when the forward/reverse travel pedal is in the **NEUTRAL** position, the cutting unit drive switch is in the **OFF** position and the parking brake is engaged. When these circumstances are satisfied, switches are activated permitting the engine to be started.

Engine Run Interlock: Once the engine is started the operator must be seated before the parking brake is released for the engine to continue to run.

Cutting Unit Drive Lockout: The drive to the cutting units is only possible when the operator is seated. If the operator raises off the seat for a period of more than one second, a switch is activated and the drive to the cutting unit is automatically disengaged. To engage drive to the cutting unit, the operator must return to the seat, then operate the cutting unit drive switch to the **OFF** position before moving it back to the **ON** position. If the operator rises off the seat for a brief

moment during normal work, drive to the cutting unit is not affected.

The engine can only be started with the cutting unit drive switch in the **OFF** position.

⚠ WARNING

Do not operate the mower if the operator presence controls are defective in any way. *Always* replace faulty parts and check that they function correctly before operating the mower.

⚠ CAUTION

If safety interlock switches are disconnected or damaged the machine could operate unexpectedly causing personal injury.

- **Do not tamper with the interlock switches.**
- **Check the operation of the interlock switches daily and replace any damaged switches before operating the machine.**

Starting and Stopping the Engine

Important: You must bleed the fuel system before starting the engine if you are starting the engine for the first time, the engine has stopped due to lack of fuel, or you have performed maintenance on the fuel system; refer to Bleeding the Fuel System.

⚠ WARNING

Before starting the engine check that:

- **You have read and understood the Safety Precautions section in this manual.**
- **The area is clear of bystanders.**
- **The cutting unit drive is disengaged.**
- **The parking brake is engaged.**
- **The travel control pedals are in neutral.**

Important: This machine is fitted with an Engine start lockout, refer to OPERATOR PRESENCE CONTROLS.

Starting a Cold Engine

1. Sit on the seat, keep your foot off of the traction pedals so that it is in Neutral, engage the parking brake and set the throttle to the 70 percent full throttle position.
2. Turn the ignition key to the ignition on position **I** and check that the engine oil pressure and battery charge warning lights illuminate.
3. Turn the ignition key to the preheat position **II** so that the pre-heat indicator light is on. Hold it for 5 seconds to heat the glow plugs.
4. After preheating the glow plugs, turn key to the start position **III** and hold to crank the engine.

   Crank the engine for no longer than 15 seconds. Release the ignition key back to position **I** when the engine starts.
5. Run the engine at low idle speed until it warms up.

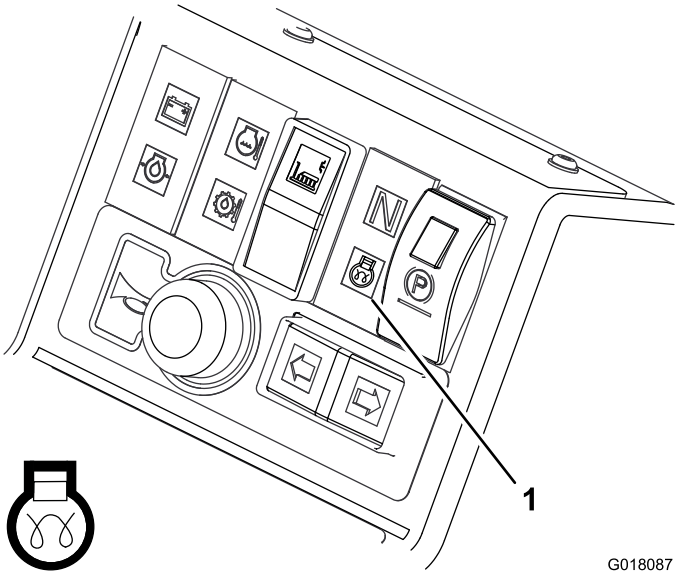


Figure 26

1. Engine pre-heat indicator light

⚠ WARNING

When the engine is operating all warning lights should be off. If a warning light illuminates, stop the engine immediately and have the fault rectified before restarting.

Starting a Warm Engine

1. Sit on the seat, keep your foot off of the traction pedal so that it is in Neutral, engage the parking brake and set the throttle to the 70 percent full throttle.
2. Turn the ignition key to the ignition on position **I** and check that the engine oil pressure and battery charge warning lights illuminate.
3. Turn the ignition key to the start position **III** and hold to crank the engine.

   Crank the engine for no longer than 15 seconds. Release the ignition key back to position **I** when the engine starts.
4. Run the engine at low idle speed until it warms up.

Stopping the Engine

1. Move all controls to Neutral, set the parking brake, move the throttle to the low idle position and allow the engine to reach low idle speed.

   Important: Allow the engine to idle for 5 minutes before shutting it off after a full load operation. Failure to do so may lead to trouble on a turbo-charged engine.

2. Let the engine idle for 5 minutes.
3. Turn the ignition key to position **0**.

   If the engine fails to stop when the ignition key is turned to **0**, operate the engine stop lever in forward direction (Figure 27).

⚠ WARNING

Keep hands clear of moving objects and hot engine parts while the engine is running.

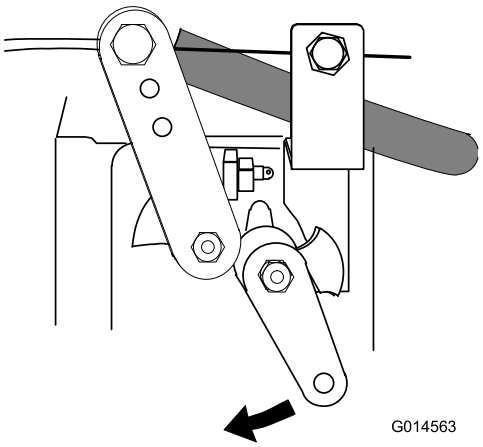


Figure 27

Cutting Unit Position Control

The cutting unit may be raised or lowered using the lift control switch.

1. To lower the cutting unit, operate the lift control switch in a downward direction and release.

   The cutting unit is now in the 'float' mode and will follow the ground contours.

2. To raise the cutting unit, operate the lift control switch in an upward direction and hold.
3. Release the lift control switch when the cutting unit is at the required height.

   The control switch will automatically return to neutral position and the arms are hydraulically locked into position.

Engaging the Cutting Unit Drive

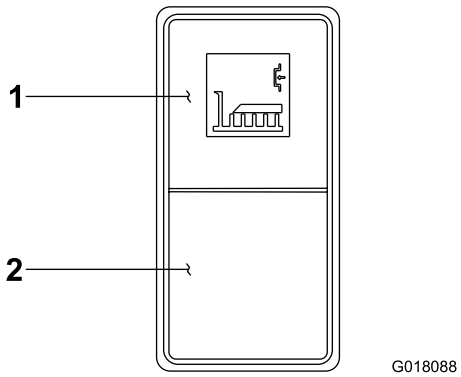


Figure 28

1. On
2. Off

The cutting unit drive can be engaged only when the operator is seated correctly, refer to Operator Presence Seat Switch (page 43).

Cutting unit drive engagement: Depress the top of the cutting unit drive switch to the forward position.

Cutting unit drive disengagement: Depress the bottom of the cutting unit drive switch to the rearward position.

Using Weight Transfer/Traction Assistance

A variable hydraulic weight transfer system is provided for improving tire grip with the grass surface - traction assistance.

Hydraulic pressure in the cutting unit lift system provides a lifting force which reduces cutting unit weight on the ground and transfers the weight as a downward force onto the mower's tires. This action is known as weight transfer.

To engage weight transfer: The amount of weight transfer can be varied to suit operating conditions by rotating the weight transfer hand wheel as follows:

1. Release the valve lock nut 1/2 turn counter-clockwise and hold.
2. Rotate the valve hand wheel.
   - Counterclockwise to reduce weight transfer.
   - Clockwise to increase weight transfer.
3. Tighten the nut.

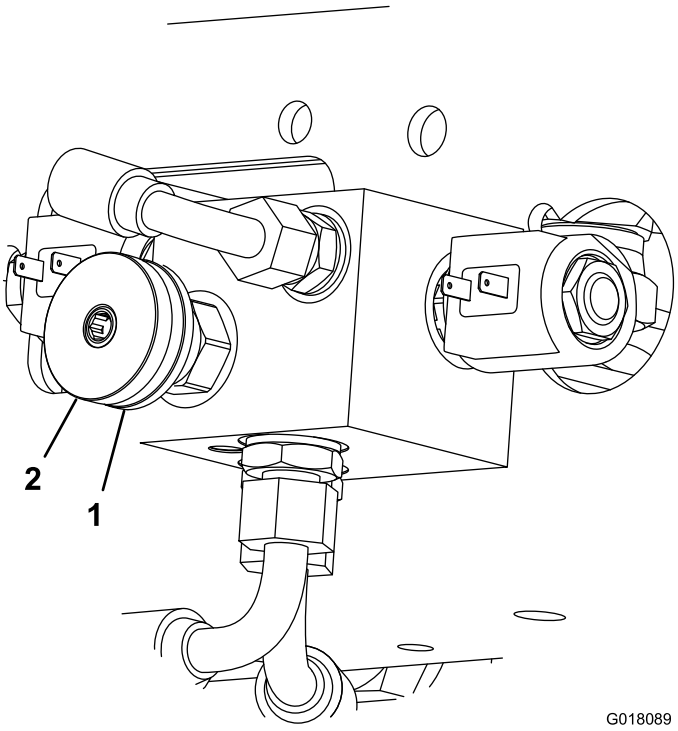


Figure 29

1. Lock Wheel
2. Weight transfer hand wheel

Folding the R.O.P.S.

The R.O.P.S frame may be folded down to allow access into areas of restricted height.

⚠ WARNING

While the R.O.P.S frame is folded down it does not provide any protection in the event of a roll-over and should not be considered as a Roll Over Protective Structure.

1. Apply the parking brake and switch off the engine.
2. Support the weight of the upper frame while removing the hand nuts, washers and retaining bolts from the pivot brackets (Figure 30).
3. Carefully lower the frame downwards until it rests on the stops.
4. Insert the retaining bolts in the lower hole and fully tighten the hand nuts to support the upper frame in its lowered position.
5. To raise the frame, follow these instructions in reverse order.

⚠ WARNING

When in the raised position, both retaining bolt assemblies must be installed and fully tightened to ensure full R.O.P.S protection.

⚠ WARNING

Be careful lowering and raising the R.O.P.S frame to prevent entrapment of fingers between fixed part and pivot part of the structure.

- Keep all nuts, bolts and screws correctly torqued ensure that the equipment is in safe working condition.
- Replace worn or damaged parts for safety.
- Ensure that the Seat Belt and Mountings are in safe working order.

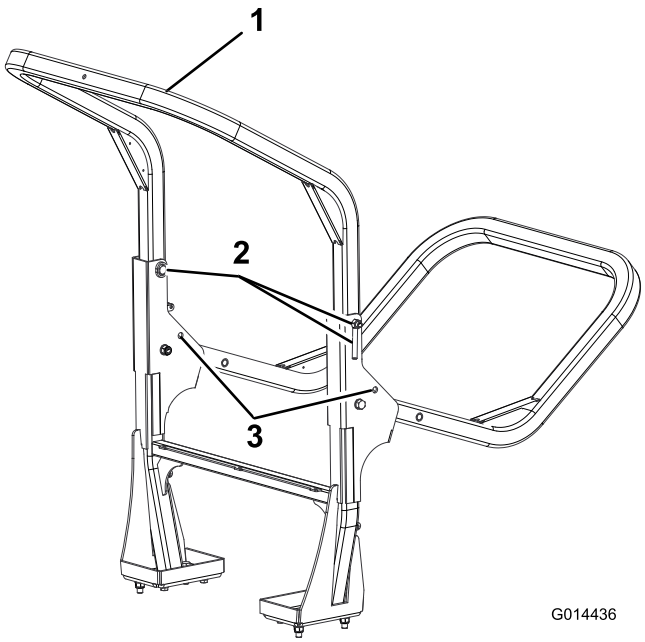


Figure 30

1. Upper frame
2. Hand nuts, washers and retaining bolts
3. Lower hole

Jacking Points

Note: Use jack stands to support the machine when required (Figure 31).

- Front—under the rear lift cylinder mount.
- Rear—axle tube on the rear axle.

Raising The Mower Off The Ground

⚠ WARNING

When the mower is raised off the ground:

- **NEVER crawl under the mower.**
- **NEVER start the engine.**

Important: Before raising the mower ensure that the lifting device to be used is in good condition and capable of supporting the weight of the mower securely. Minimum lift capacity 2000 Kg (2 Tons).

1. Park the mower on level ground.
2. Set the parking brake.
3. Turn the engine switch to off and remove the ignition key.
4. Ensure the ground under the lifting device is level and firm.
5. Align and ensure the lifting device is secure against one of the mowers lifting points.
6. If raising the front of the mower, chock the rear wheels to prevent the mower rolling away.

   Note: The parking brake only operates on the front wheels.

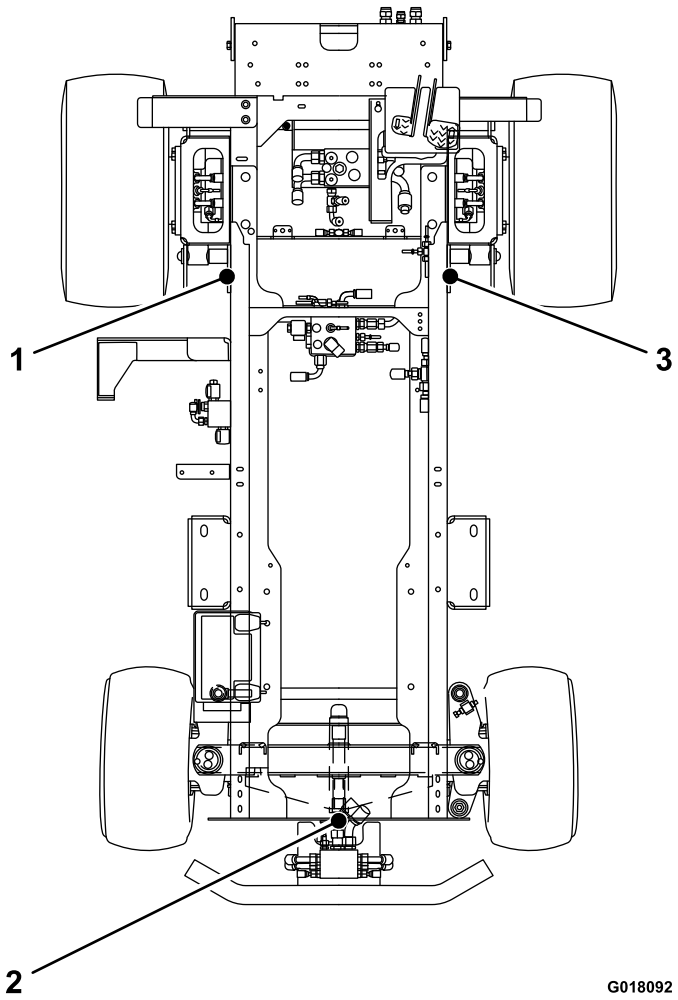


Figure 31

1. Front left hand lifting point
2. Rear lifting point
3. Front right hand lifting point

Operating Tips

Familiarization

Before mowing grass, practice operating the machine in an open area. Start and stop the engine. Operate in forward and reverse. Lower and raise the cutting unit and engage and disengage the cutting unit. When you feel familiar with the machine, practice operating up and down slopes at different speeds.

Warning System

If a warning light comes on during operation, stop the machine immediately and correct the problem before continuing operation. Serious damage could occur if you operate the machine with a malfunction.

Mowing

The speed of the cutting unit blades should always be kept as high as possible in order to maintain the highest quality of cut. This in turn requires that the engine speed be kept as high as possible.

Cutting performance is best when cutting against the lie of the grass. In order to take advantage of this fact, the operator should attempt to alternate the direction of mowing between cuts.

Quality of Cut

The quality of cut will deteriorate if the forward speed is excessive. Always balance the quality of cut with the work rate required and set the forward speed accordingly.

Engine

Never let the engine labor. Reduce the forward speed or increase the height of cut.

Transporting

Always disengage the cutting unit drive when travelling across un-grassed areas. Be careful when driving between objects so you do not accidentally damage the machine or cutting units.

⚠ WARNING

Take care when travelling over obstacles such as roadside curbs. Always travel at slow speed over obstacles to prevent damage to the machines tires, wheels and steering system. Ensure that tires are inflated to the recommended pressures.

Slopes

Use extra care when operating the machine on slopes. Drive slowly and avoid sharp turns on slopes to prevent roll overs. Lower the cutting unit when going downhill for steering control.

Maintenance

Note: Determine the left and right sides of the machine from the normal operating position.

Recommended Maintenance Schedule(s)

Maintenance Service Interval	Maintenance Procedure
After the first 8 hours	• Check the condition and tension of the alternator belt.
After the first 50 hours	• Change the engine oil and filter. • Change the transmission oil filter. • Change the hydraulic return filter. • Check the engine RPM (idle and full throttle).
Before each use or daily	• Check the engine oil level. • Check the cooling system. • Check fuel level. • Check the hydraulic fluid level. • Torque the wheel lug nuts. • Check the tire pressure. • Check the air cleaner blockage indicator. (Service the air cleaner earlier if the air cleaner indicator shows red. Service it more frequently in extremely dirty or dusty conditions.) • Remove debris from the screen, oil coolers, and radiator (more frequently in dirty operating conditions). • Check safety interlock system. • Check the hydraulic lines and hoses for leaks, kinked lines, loose mounting supports, wear, loose fittings, weather deterioration, and chemical deterioration.
Every 50 hours	• Grease the bearings, bushings and pivots (Grease them immediately after every washing regardless of the interval listed.)
Every 100 hours	• Inspect the cooling system hoses. • Check the condition and tension of the alternator belt.
Every 150 hours	• Change the engine oil and filter.
Every 200 hours	• Drain moisture from the fuel and hydraulic fluid tanks.
Every 250 hours	• Check Battery Condition • Check the condition of and clean the battery. • Check the transmission control cable.
Every 400 hours	• Replace the fuel filter canister • Check the fuel lines and connections. • Check the engine RPM (idle and full throttle).
Every 500 hours	• Check Engine Overheat Warning System • Replace the primary air filter. (More frequently in extreme dusty or dirty conditions) • Check Electrical System • Change the transmission oil filter. • Change the hydraulic return filter. • Check the rear wheel alignment. • Service the Hydraulic System • Check Hydraulic Oil Overheat Warning System
Every 800 hours	• Drain and clean the fuel tank • Adjust the engine valves (refer to the engine Operator's Manual)
Before storage	• Drain and clean the fuel tank
Every 2 years	• Flush and replace the cooling system fluid. • Replace all moving hoses.

Daily Maintenance Checklist

Duplicate this page for routine use.

Maintenance Check Item	For the week of:						
	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.	Sun.
Check the safety interlock operation.							
Check the brake operation.							
Ensure R.O.P.S. is in the vertical/upright and locked position.							
Check the engine oil and fuel level.							
Check the air filter restriction indicator.							
Check the radiator and screen for debris.							
Check unusual engine noises.[1]							
Check unusual operating noises.							
Check the hydraulic system oil level.							
Check hydraulic hoses for damage.							
Check for fluid leaks.							
Check the tire pressure.							
Check the instrument operation.							
Check all grease fittings for lubrication.[2]							
Touch-up damaged paint.							

1. Check the glow plug and injector nozzles if hard starting, excess smoke, or rough running is noted.

2. Immediately after every washing, regardless of the interval listed

Notation for Areas of Concern

Inspection performed by:		
Item	**Date**	**Information**
1		
2		
3		
4		
5		
6		
7		
8		

Important: **Refer to your *Engine Operator's Manual* for additional maintenance procedures.**

Pre- Maintenance

Before preforming any maintenance ensure the engine is switched to off and the ignition key is removed, the parking brake is set, there is no pressure in the hydraulic system, the cutting unit is down on the ground and the safety precautions in this manual have been read and understood.

⚠ CAUTION

If you leave the key in the ignition switch, someone could accidently start the engine and seriously injure you or other bystanders.

Remove the key from the ignition before you do any maintenance.

Important: Regular maintenance is essential for the continued safe operation of the machine. Correct servicing will prolong the working life of the machine and safeguard the Warranty. Always use genuine TORO service parts as these are accurately matched to the required duty.

Dirt and contamination are the enemies of any hydraulic system. When carrying out maintenance procedures on the hydraulic system always ensure that the work area and the components are thoroughly clean before, during and after refitting. Ensure that all open hydraulic lines and ports, etc. are plugged during maintenance procedures.

The recommended service intervals are based on normal operating conditions. Severe or unusual conditions will necessitate shorter service intervals.

Always grease the pivot points immediately after pressure washing or steam cleaning.

⚠ WARNING

The engine, transmission oil and hydraulic systems will be hot after machine use. Allow the systems to cool before working on the machine, particularly before working on the engine or when changing oil or oil filters.

Lubrication

Greasing the Bearings, Bushings and Pivots

Service Interval: Every 50 hours

Lubricate all grease fittings for the bearings and bushings with No. 2 General Purpose Lithium Base Grease.

Lubricate bearings and bushings **immediately** after every washing, regardless of the interval listed.

Replace any grease zerks that become damaged.

Grease all mower grease points and ensure that sufficient grease is injected such that clean grease is seen to escape. This will ensure maximum working life.

The grease fitting locations and quantities are as follows:

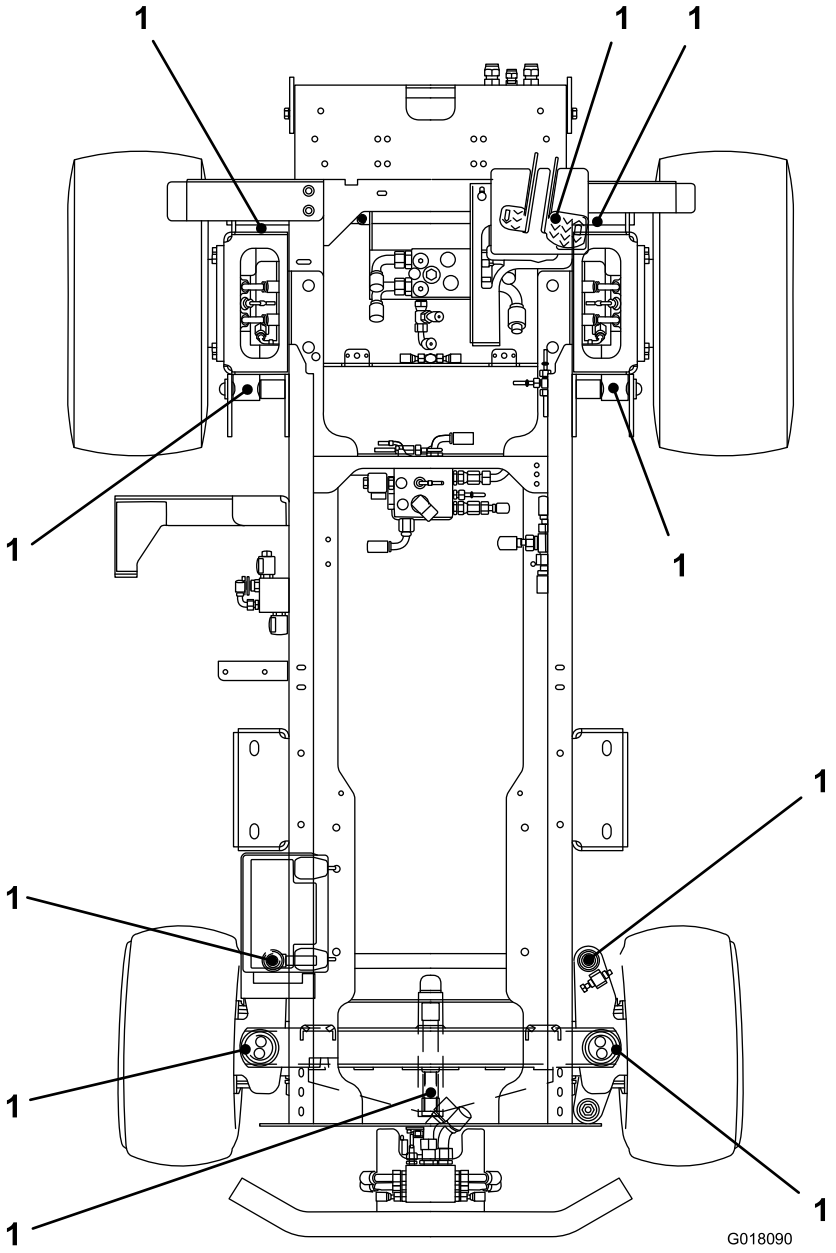


Figure 32

1. Grease every 50 hours

Engine Maintenance

Check the Engine Overheat Warning System

Service Interval: Every 500 hours

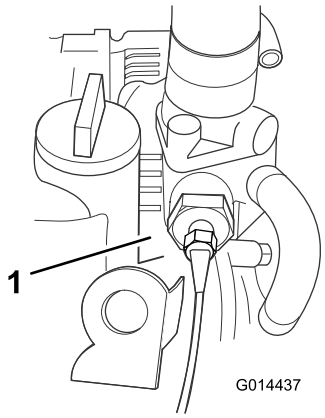


Figure 33

1. Temperature switch

1. Turn the ignition key to position I.
2. Disconnect the Red/Blue wire terminal from the engine temperature switch.
3. Touch the metal terminal of this wire onto a suitable earth point, ensuring that the metal surfaces make good contact.

The horn will sound and the engine coolant temperature warning light will illuminate to confirm correct operation. If the system is faulty, make repairs before operating the mower.

Servicing the Air Cleaner

Service Interval: Before each use or daily
Every 500 hours

Servicing the Primary Air Filter

Check the air cleaner body for damage which could cause an air leak. Replace if damaged. Check the whole intake system for leaks, damage or loose hose clamps.

Service the primary air cleaner filter only when the service indicator (Figure 34) requires it. Changing the air filter before it is necessary only increases the chance of dirt entering the engine when the filter is removed.

Important: Be sure the cover is seated correctly and seals with the air cleaner body.

1. Check the filter blockage indicator. If the indicator is red, the air filter needs to be replaced (Figure 34).

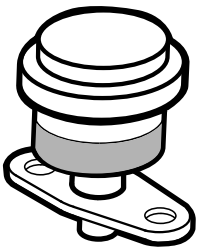


Figure 34

2. Before removing the filter, use low pressure air (40 psi, clean and dry) to help remove large accumulations of debris packed between outside of the filter and the canister. **Avoid using high pressure air which could force dirt through the filter into the intake tract.** Remove the cover from the air cleaner body.

   This cleaning process prevents debris from migrating into the intake when the filter is removed.

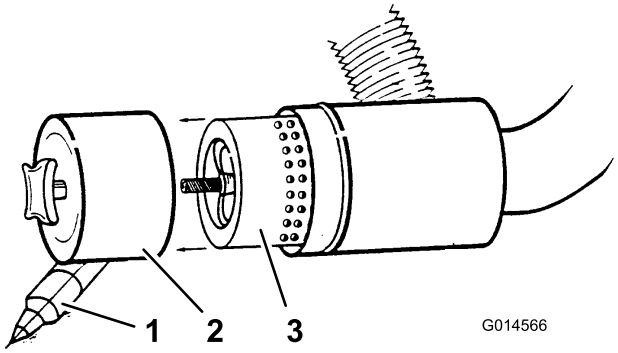


Figure 35

1. Dust boot
2. Dust bowl
3. Air filter

3. Remove and replace the filter (Figure 35).

   Cleaning of the used element is not recommended due to the possibility of damage to the filter media.
4. Inspect the new filter for shipping damage, checking the sealing end of the filter and the body. **Do not use a damaged element.**
5. Insert the new filter by applying pressure to the outer rim of the element to seat it in the canister. **Do not apply pressure to the flexible center of the filter.**
6. Clean the dirt ejection port located in the removable cover. Remove the rubber outlet valve from the cover, clean the cavity and replace the outlet valve.
7. Install the cover orienting the rubber outlet valve in a downward position—between approximately 5:00 to 7:00 when viewed from the end.

8. Check the condition of the air cleaner hoses.
9. Secure the cover.

Servicing the Safety Filter

The air filter has a secondary, safety filter element inside the primary air filter to prevent dislodged dust and other items from entering the engine while changing the main element.

Replace the safety filter, never clean it.

Important: Never attempt to clean the safety filter. If the safety filter is dirty, then the primary filter is damaged. Replace both filters.

Servicing the Engine Oil and Filter

Service Interval: After the first 50 hours

Every 150 hours

1. Remove the drain plug (Figure 36) and let the oil flow into a drain pan.

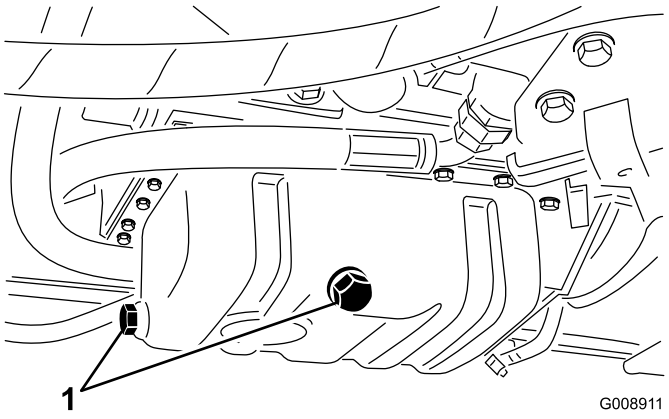


Figure 36

1. Oil drain plug

2. When the oil stops, install the drain plug.
3. Remove the oil filter (Figure 37).

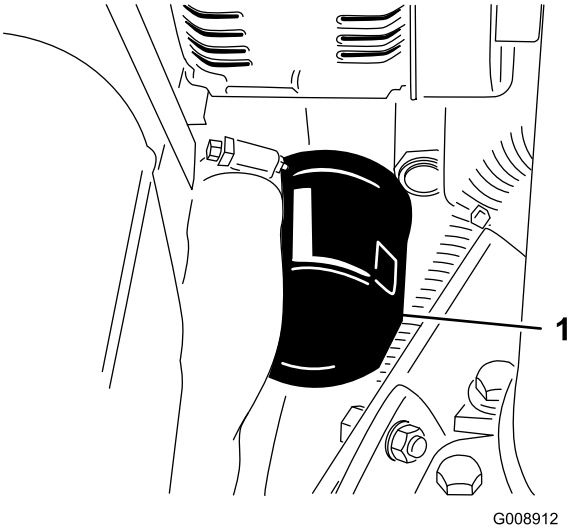


Figure 37

1. Oil filter

4. Apply a light coat of clean oil to the new filter seal.
5. Install the replacement oil filter to the filter adapter. Turn the oil filter clockwise until the rubber gasket contacts the filter adapter, then tighten the filter an additional 1/2 turn.

   Important: Do not over-tighten the filter.
6. Add oil to the crankcase; refer to Checking the Engine Oil.

Fuel System Maintenance

⚠ DANGER

Under certain conditions, diesel fuel and fuel vapors are highly flammable and explosive. A fire or explosion from fuel can burn you and others and can cause property damage.

- **Use a funnel and fill the fuel tank outdoors, in an open area, when the engine is off and is cold. Wipe up any fuel that spills.**
- **Do not fill the fuel tank completely full. Add fuel to the fuel tank until the level is 1/4 to 1/2 inches (6 to 12 mm) below the bottom of the filler neck. This empty space in the tank allows the fuel to expand.**
- **Never smoke when handling fuel, and stay away from an open flame or where fuel fumes may be ignited by a spark.**
- **Store fuel in a clean, safety-approved container and keep the cap in place.**

Replacing the Fuel Filter

Service Interval: Every 400 hours

Important: Replace the fuel filter canister periodically to prevent wear of the fuel injection pump plunger or the injection nozzle, due to dirt in the fuel.

1. Place a clean container under the fuel filter canister (Figure 38).
2. Clean the area where the filter canister mounts.

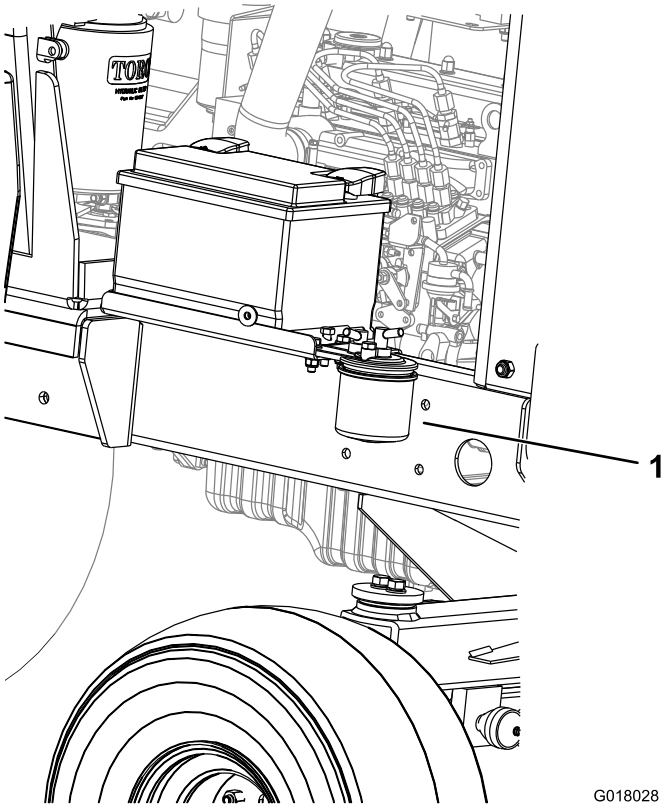


Figure 38

1. Fuel filter

3. Remove the filter canister and clean the mounting surface
4. Lubricate the gasket on the filter canister with clean oil.
5. Install the new filter canister by hand until the gasket contacts mounting surface.
6. Bleed the fuel system; refer to Bleeding the Fuel System

Bleeding the Fuel System

You must bleed the fuel system before starting the engine if any of the following situations have occurred:

- Initial start up of a new machine.
- Engine has ceased running due to lack of fuel.
- Maintenance has been performed upon fuel system components; i.e., filter replaced, separator serviced, etc.

⚠ DANGER

Under certain conditions, diesel fuel and fuel vapors are highly flammable and explosive. A fire or explosion from fuel can burn you and others and can cause property damage.

- **Use a funnel and fill the fuel tank outdoors, in an open area, when the engine is off and is cold. Wipe up any fuel that spills.**
- **Do not fill the fuel tank completely full. Add fuel to the fuel tank until the level is 1/4 to 1/2 inches (6 to 12 mm) below the bottom of the filler neck. This empty space in the tank allows the fuel to expand.**
- **Never smoke when handling fuel, and stay away from an open flame or where fuel fumes may be ignited by a spark.**
- **Store fuel in a clean, safety-approved container and keep the cap in place.**

1. Park the machine on a level surface and ensure that the fuel tank is at least half full.
2. Open the hood.
3. Turn the key in the ignition switch to the ON position and crank the engine. The mechanical pump will suck fuel out of the tank, fill the fuel filter and fuel hose and force the air into the engine. This could take some time to fully purge all the air out of the system and the engine might fire erratically until all air is purged out. When all air is purged and the engine is running smoothly, it should be run for a few minutes to ensure that it is fully purged.

Draining the Fuel Tank

Service Interval: Every 800 hours

Before storage

Drain and clean the fuel tank if the fuel system becomes contaminated or if the machine is to be stored for an extended period. Use clean fuel to flush out the tank.

Checking the Fuel Lines and Connections

Service Interval: Every 400 hours/Yearly (whichever comes first)

Check the fuel lines and connections. Inspect them for deterioration, damage, or loose connections.

Electrical System Maintenance

Important: Before welding on the machine, disconnect both cables from the battery and the terminal connector from the alternator to prevent damage to the electrical system.

Check Electrical System

Service Interval: Every 500 hours

Inspect all electrical connections and cables and replace any which are damaged or corroded. Spray a good quality water inhibitor onto exposed connections to prevent moisture ingress.

Check Battery Condition

Service Interval: Every 250 hours

Note: When removing the battery, always disconnect the negative (-) cable first.

Note: When installing the battery, always connect the negative (-) cable last.

Raise the engine cover. Remove any corrosion from the battery terminals using a wire brush and apply petroleum jelly to the terminals to prevent further corrosion. Clean the battery compartment.

Under normal operating conditions the battery will not require any further attention. If the machine has been subject to continuous use under high ambient temperature conditions, the battery electrolyte may require topping up.

Remove the cell covers and top up with distilled water to a height 1/2 inch (15 mm) below the top of the battery. Install the cell covers.

Note: Check the condition of the battery cables. Install new cables when current ones are showing signs of wear or damage and tighten any loose connections as necessary.

Servicing the Battery

Service Interval: Every 250 hours

⚠ DANGER

Battery electrolyte contains sulfuric acid which is a deadly poison and causes severe burns.

- **Do not drink electrolyte and avoid contact with skin, eyes, or clothing. Wear safety glasses to shield your eyes and rubber gloves to protect your hands.**
- **Fill the battery where clean water is always available for flushing the skin.**

⚠ WARNING

Charging the battery produces gasses that can explode.

Never smoke near the battery and keep sparks and flames away from it.

Check the battery condition. Keep the terminals and the entire battery case clean because a dirty battery will discharge slowly. To clean the battery, wash the entire case with a solution of baking soda and water. Rinse it with clear water.

Drive System Maintenance

Changing the Transmission Oil Filter

Service Interval: After the first 50 hours

Every 500 hours

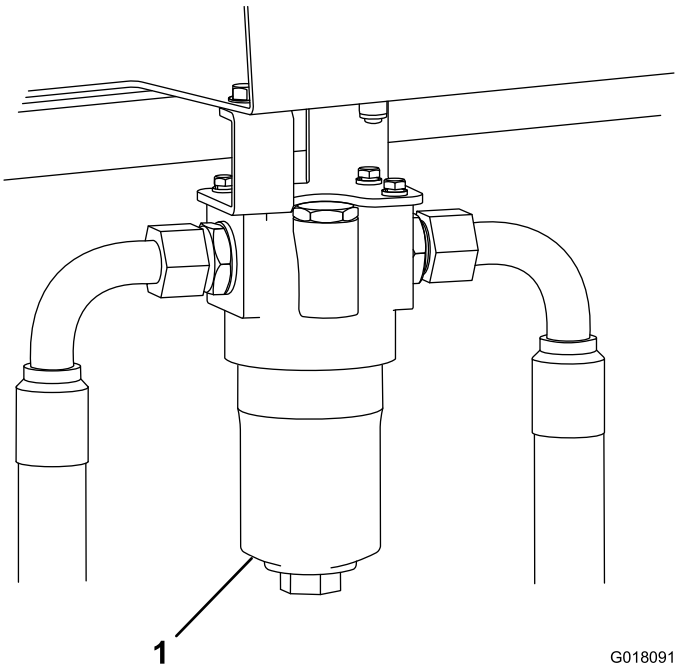


Figure 39

Right hand side of machine

1. Transmission oil filter

1. Unscrew and remove the bottom of the transmission oil filter housing.
2. Withdraw the filter element and discard.
3. Refit a new filter element (Part no. 924709).
4. Install the housing.

Changing the Hydraulic Return Filter

Service Interval: After the first 50 hours

Every 500 hours

1. Remove the return filter.
2. Wipe oil onto the new return filter gasket.
3. Install the new return filter to the machine.

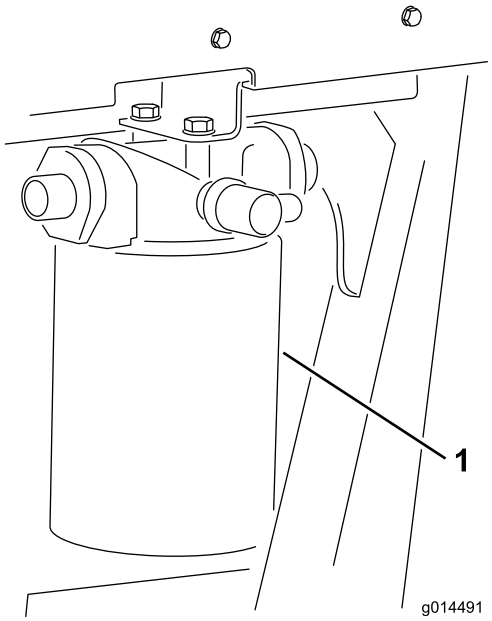


Figure 40
Left hand side of machine

1. Hydraulic oil return filter

Check Rear Wheel Alignment

Service Interval: Every 500 hours

To prevent excessive tire wear and ensure safe machine operation, the rear wheels must be correctly aligned to 0.12-0.31 inches (3-8 mm).

Set the rear wheels in the straight ahead position. Measure and compare the distance between the front sidewalls and the rear sidewalls at the wheel centre height. The distance between the front sidewalls must be set 0.12-0.31 inches (3-8 mm)) less than the distance between the rear sidewalls.

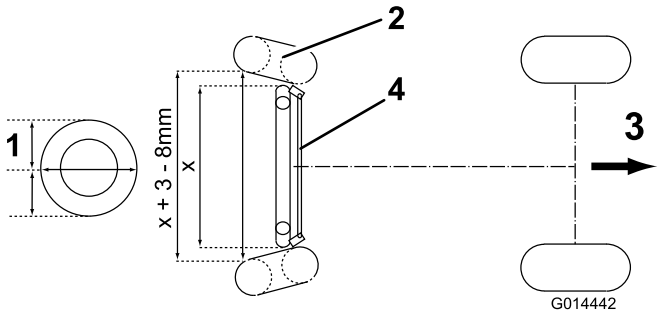


Figure 41

1. Wheel center height
2. Tire
3. Direction of forward travel
4. Track-rod assembly

To adjust the alignment of the rear wheels, first back off the left hand and right hand locknuts on the track rod assembly. (Left hand locknut is a left hand thread). Rotate the track rod to achieve the correct distance as described above and tighten the locknuts securely.

Cooling System Maintenance

Removing Debris from the Cooling System

Service Interval: Before each use or daily

Every 100 hours

Every 2 years

1. Park the machine on a level surface, stop the engine, set the parking brake and remove the key from the ignition switch.
2. Clean the radiator screen.
3. Thoroughly clean all debris out of the engine area.
4. Release the latch and open the engine cover (Figure 42).

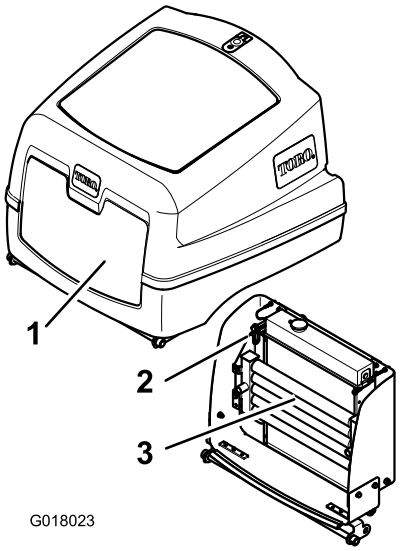


Figure 42

1. Engine cover
2. Oil cooler
3. Oil cooler release clip

5. Clean the screen thoroughly with compressed air.
6. Pivot the latch inward to release the oil cooler (Figure 43).

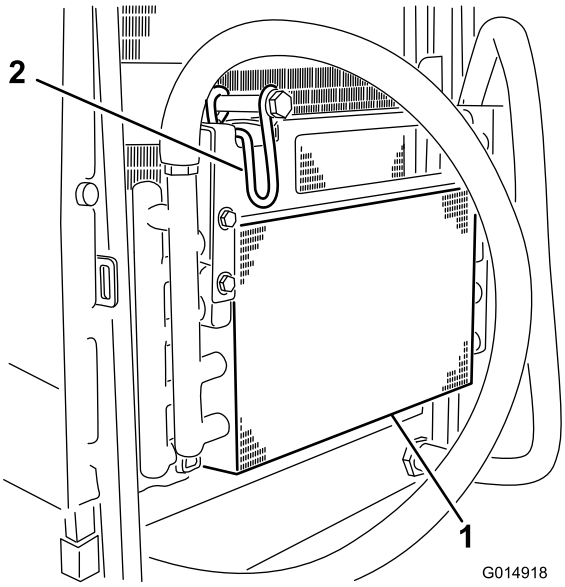


Figure 43

1. Oil cooler
2. Oil cooler latch

7. Thoroughly clean both sides of the oil cooler and the radiator (Figure 44) with compressed air.

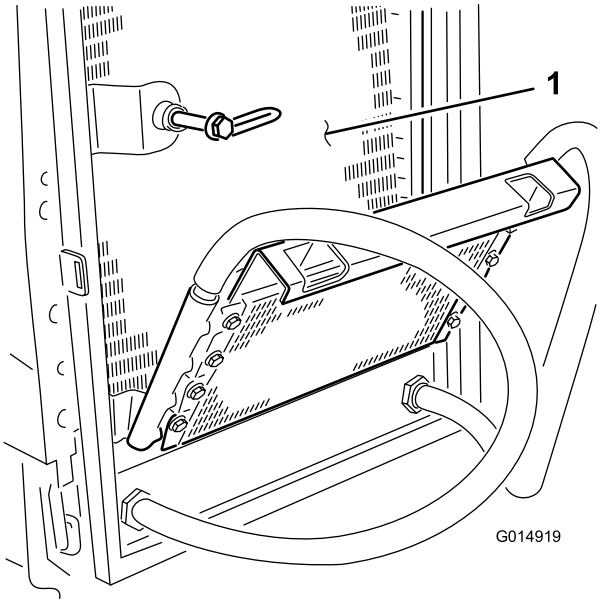


Figure 44

1. Radiator

8. Pivot the oil cooler back into position and secure the latch.
9. Close the engine cover and secure the latch.

Brake Maintenance

Towing the Mower

Ensure that the towing vehicle specification is suited to braking the combined vehicle weight and able to remain in complete control at all times. Ensure the towing vehicle's parking brake is applied. Chock the mower front wheels to prevent the mower rolling away.

De-commision the front wheel motor disc brakes as follows :

1. Connect a rigid tow bar between the towing eye on the mower and a suitable towing vehicle.
2. Identify the right hand front wheel motor disc brake assembly and remove the hex plug.
3. Locate the M12 x 40 setscrew stored underneath the operator platform, one in each of the platform support rails.
4. Install a M12 x 40mm long setscrew with washer into the hole in the centre of the motor end plate.
5. Tighten the setscrew into the threaded hole in the brake piston until the brake is released (Figure 45).

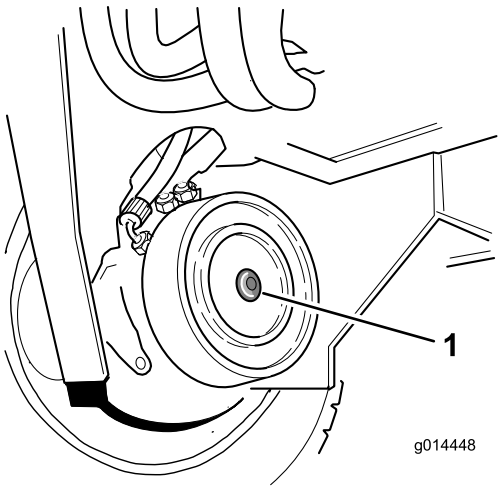


Figure 45

1. Hex plug 950639

6. Identify the left hand front wheel motor disc brake assembly and repeat the previous procedure (Figure 46).

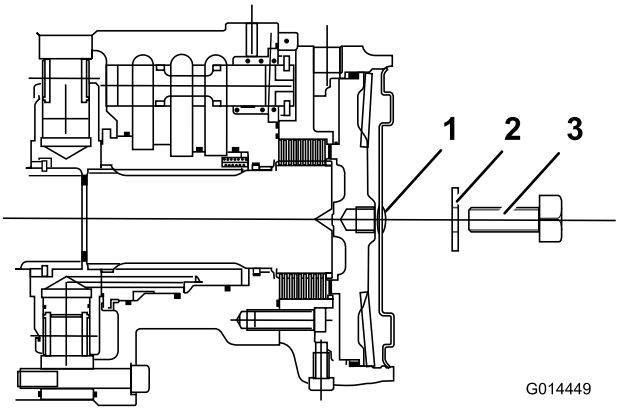


Figure 46

1. Hex plug 950639
2. Washer M12–09485
3. Setscrew M12 x 40 — ZDH1L040U

7. De-commission the hydraulic service braking system by turning the bypass valve, located under the transmission pump, clock-clockwise, a maximum of three turns.

   The steering must be operated manually when the mower is being towed. The steering will feel heavy as there is no hydraulic assistance when the engine is switched off (Figure 47).

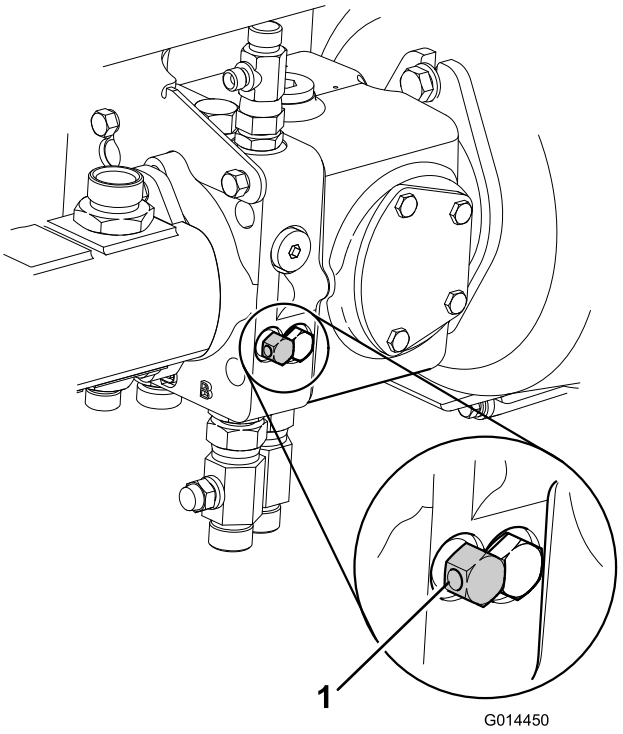


Figure 47

1. Transmission Bypass Valves

8. The mower is now in a free wheel condition and can be towed for a short distance at slow speed. Remove wheel chocks before towing.

9. **After towing the mower:** To return the mower to its normal working condition the following procedure must be done.
   A. Chock the front wheels.
   B. Close the bypass valve on the transmission pump by turning it clockwise.
10. **Commission the front wheel motor disc brakes as follows :**

    Note: Ensure the M12 x 40 setscrews are removed and stored underneath the operator platform.

    A. Identify the right hand front wheel motor disc brake assembly.
    B. Rotate the setscrew counter-clockwise and remove with washer.
    C. Assemble the hex plug into the motor end plate (Figure 48).

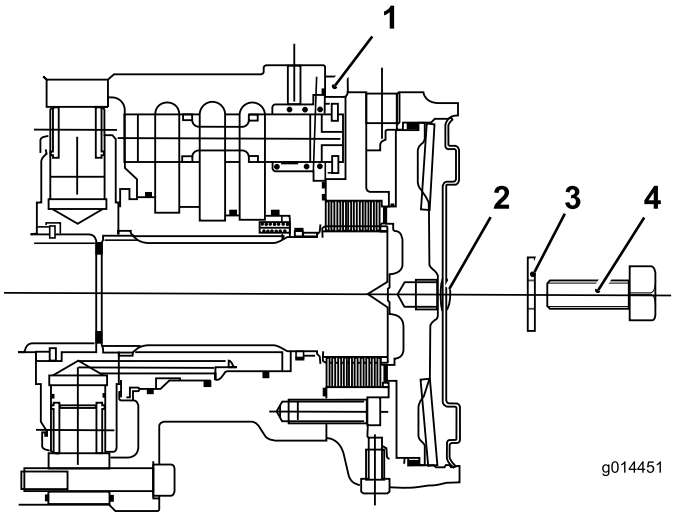


Figure 48

1. Front wheel motor 111–2557
2. Hex plug 950639
3. Washer M12–09485
4. Setscrew M12x40 — XH1L040U

   D. Identify the left hand front wheel motor disc brake assembly and repeat the previous procedure.
   E. Remove the wheel chocks.
   F. Disconnect the tow bar. The mower braking system will now operate in the normal way.

⚠ WARNING

Before using the mower, ensure that the braking system operates correctly. Carry out initial checks with the mower at slow speed. Do not operate the mower with a damaged braking system. Do not operate the mower with the brakes de-commissioned.

Belt Maintenance

Check the condition and tension of the alternator belt after the first day of operation and every 100 operating hours thereafter.

Tensioning the Alternator Belt

Service Interval: After the first 8 hours

Every 100 hours

1. Open the hood.
2. Check the tension of the alternator belt by depressing it (Figure 49) midway between the alternator and the crankshaft pulleys with 22 lb (10 kg) of force.

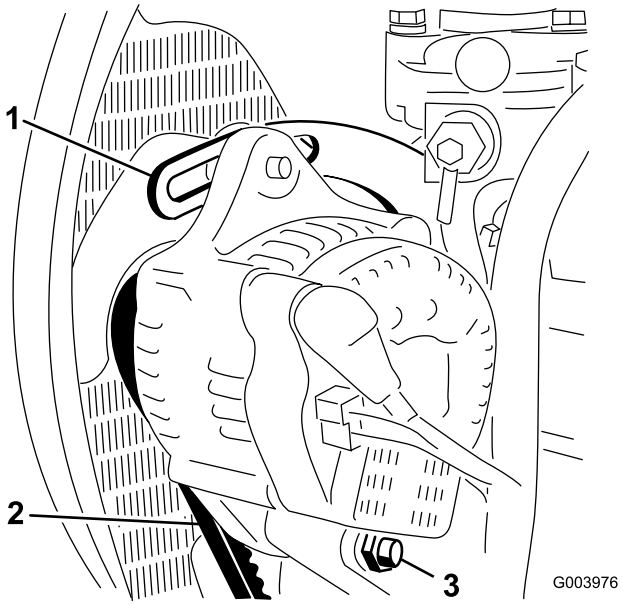


Figure 49

1. Brace
2. Alternator belt
3. Pivot bolt

   The belt should deflect 7/16 inch (11 mm). If the deflection is incorrect, proceed to step 3 If correct, continue operation.
3. Loosen the bolt securing the brace to the engine (Figure 49), the bolt securing the alternator to the brace and the pivot bolt.
4. Insert a pry bar between the alternator and the engine and pry out on the alternator.
5. When you achieve the proper tension, tighten the alternator, brace and pivot bolts to secure the adjustment.

Controls System Maintenance

Check Forward/Reverse Travel Pedal Action

With the engine switched off, operate the forward and reverse travel pedals through the full range of articulation and ensure that the mechanism returns freely to the neutral position.

Operator Presence Seat Switch

Service Interval: Before each use or daily

1. Sit on the operator seat and start the engine.
2. Lower the cutting unit to the ground.
3. Engage the cutting unit drive switch.
4. Rise from the operators seat and check that the cutting unit comes to a stop after an initial 0.5 to 1 second delay.

Cutting Unit Interlock Switch

1. Stop the mower engine.
2. Operate the cutting unit drive switch to the off position and turn the ignition key to position **I**. The cutting unit drive switch indicator light should not illuminate. Refer to Control Panel Components (page 11).
3. Operate the switch to the on position. The indicator light should illuminate and the engine should not start when the ignition key is turned.

Parking Brake Interlock Switch

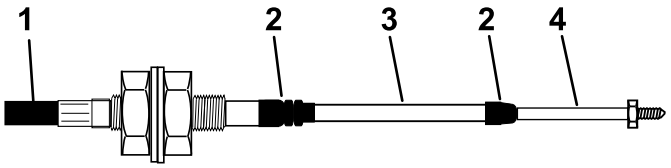
1. Stop the engine.
2. Engage the parking brake.
3. Turn the ignition key to position **I**. The parking brake indicator light should illuminate.
4. Disengage the parking brake. The indicator light should go out and the engine should not start when the ignition key is turned.
5. Set the parking brake, sit on the operator seat and start the engine.
6. Release the parking brake.
7. Rise from the operator seat and check that the engine stops.

Inspect Transmission Control Cable and Operating Mechanism

Service Interval: Every 250 hours

Check the condition and security of the cable and operating mechanism at the speed control pedals and transmission pump ends.

- Remove build up of dirt, grit and other deposits.
- Ensure that the ball joints are securely anchored and check that mounting brackets and cable anchors are tight and free from cracks.
- Inspect end fittings for wear, corrosion, broken springs, and replace if necessary.
- Ensure that the rubber seals are correctly located and are in good condition.
- Ensure that the articulating sleeves supporting the inner cable are in good condition and firmly attached to the outer cable assembly at the crimped connections. If there are any signs of cracking or detachment install a new cable immediately.
- Check that sleeves, rods, and inner cable are free from bends, kinks, or other damage. If they are not, install a new cable immediately.
- With the engine switched off, operate the pedal controls through the entire range and ensure that the mechanism moves smoothly and freely to the neutral position without sticking or hanging up.



g014571

Figure 50

1. Outer cover
2. Rubber seal
3. Sleeve
4. Rod end

Transmission Neutral Interlock Switch

1. Stop the mower engine.
2. Remove your foot from the forward/reverse travel pedals.
3. Turn the ignition key to position **I** and the transmission neutral indicator light should illuminate.
4. Apply light pressure to the travel pedals in a forward and reverse direction to check that the indicator light turns off.

Note: Take extreme care to ensure that the area around the mower is clear before checking that the engine will not start under this condition.

Hydraulic System Maintenance

⚠ WARNING

Hydraulic fluid escaping under pressure can penetrate skin and cause injury.

- **Make sure all hydraulic fluid hoses and lines are in good condition and all hydraulic connections and fittings are tight before applying pressure to the hydraulic system.**
- **Keep your body and hands away from pin hole leaks or nozzles that eject high pressure hydraulic fluid.**
- **Use cardboard or paper to find hydraulic leaks.**
- **Safely relieve all pressure in the hydraulic system before performing any work on the hydraulic system.**
- **Get immediate medical help if fluid is injected into skin.**

Service the Hydraulic System

Service Interval: Every 500 hours

Note: Keep water away from electrical components. Use a dry cloth or brush to clean such areas.

This procedure is best carried out when the hydraulic oil is warm (not hot). Lower the cutting unit to the ground and drain the hydraulic system.

1. Remove the oil tank filler flange to gain access to the suction strainer.
2. Unscrew and remove the strainer and clean with paraffin or petrol before installing.
3. Install the return line oil filter element.
4. Install the transmission oil filter element.
5. Refill the hydraulic tank with fresh clean hydraulic oil of the recommended grade, refer to Specifications (page 20).
6. Run the machine and operate all hydraulic systems until the hydraulic oil is warm.
7. Check the oil level and top up as necessary to the upper mark on the sight level gauge.

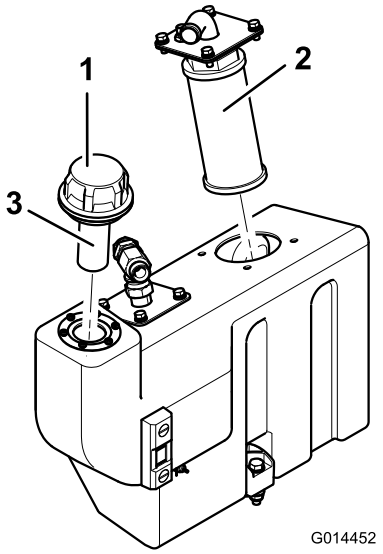


Figure 51

1. Oil tank filler cap
2. Suction strainer
3. Filler strainer

Check the Hydraulic Oil Overheat Warning System

Service Interval: Every 500 hours

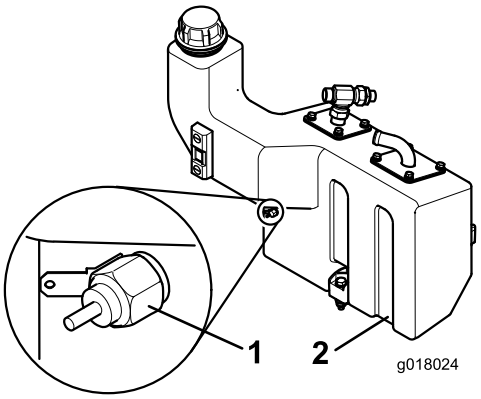


Figure 52

1. Temperature switch
2. Hydraulic oil tank

1. Turn the ignition key to the ignition on position I.
2. Disconnect the Red/Yellow wire terminal from the hydraulic tank temperature switch.
3. Touch the metal terminal of the wire onto a suitable earth point, ensuring that the metal surfaces make good contact.

The horn will sound and the hydraulic oil temperature warning light will illuminate to confirm correct operation. If necessary, make repairs before operating the mower.

Checking the Hydraulic Lines and Hoses

Daily, check hydraulic lines and hoses for leaks, kinked lines, loose mounting supports, wear, loose fittings, weather deterioration, and chemical deterioration. Make all necessary repairs before operating.

Miscellaneous Maintenance

Waste Disposal

Engine oil, batteries, hydraulic oil, and engine coolant are pollutants to the environment. Dispose of these according to your local regulations.

When disposing of hazardous waste products, take them to an authorized disposal site. Waste products must not be allowed to contaminate surface water, drains or sewage systems.

⚠ CAUTION

Dispose of hazardous substances correctly.

- **Do not dispose of batteries with a separate collection mark into general waste.**
- **When disposing of hazardous waste products, take them to an authorized disposal site.**

Storage

Preparing the Traction Unit

1. Thoroughly clean the traction unit, cutting unit, and engine.
2. Check the tire pressure.
3. Check all fasteners for looseness and tighten them as necessary.
4. Grease all grease fittings and pivot points. Wipe up any excess lubricant.
5. Lightly sand and use touch-up paint on painted areas that are scratched, chipped, or rusted.
6. Service the battery and cables as follows:
   A. Remove the battery terminals from the battery posts.
   B. Clean the battery, terminals, and posts with a wire brush and baking soda solution.
   C. Coat the cable terminals and battery posts with Grafo 112X skin-over grease (Toro Part No. 505-47) or petroleum jelly to prevent corrosion.
   D. Slowly recharge the battery every 60 days for 24 hours to prevent lead sulfation of the battery.

Preparing the Engine

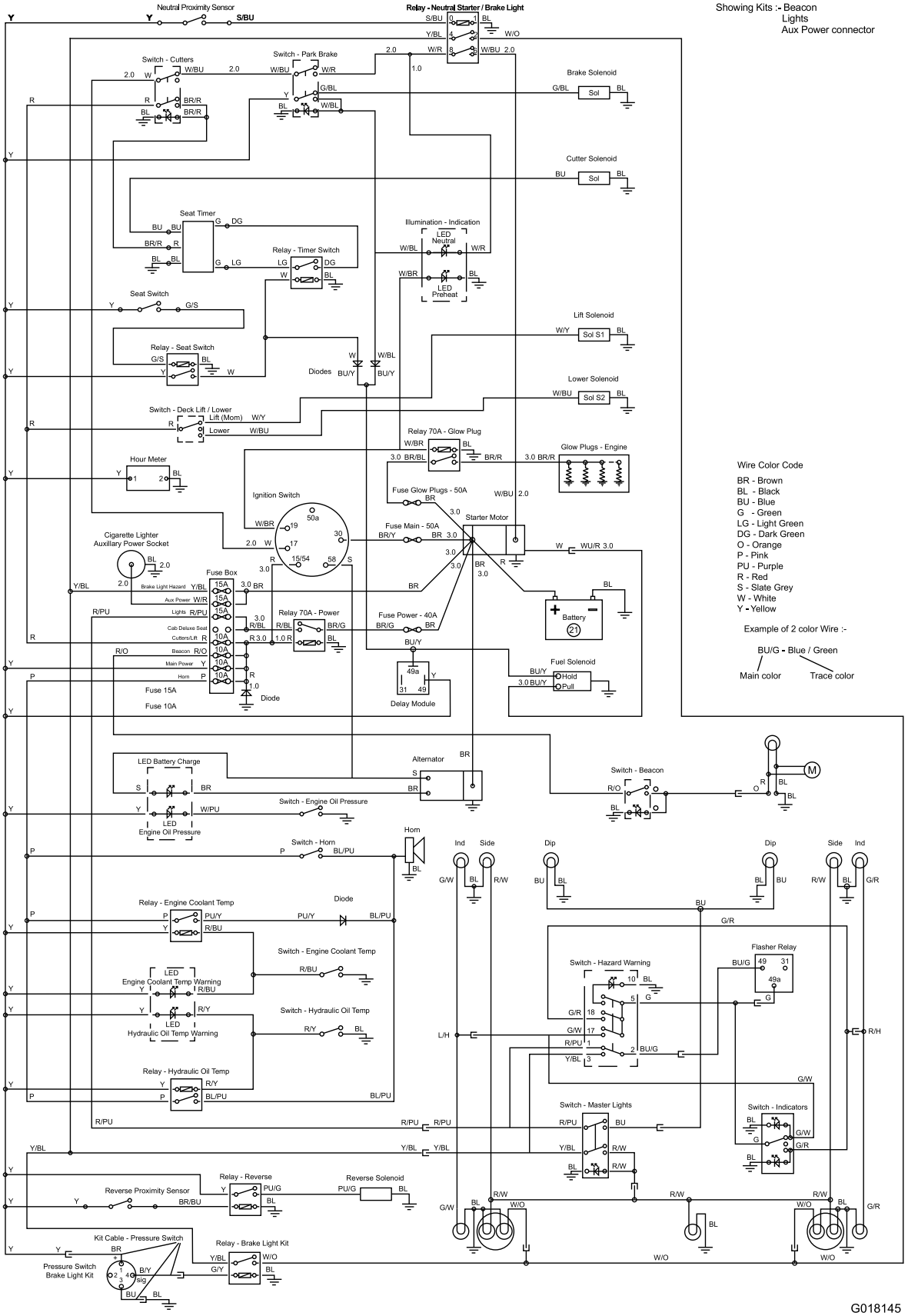
1. Drain the engine oil from the oil pan and replace the drain plug.
2. Remove and discard the oil filter. Install a new oil filter.
3. Refill the oil pan with designated quantity of motor oil.
4. Start the engine and run it at idle speed for approximately two minutes.
5. Stop the engine.
6. Thoroughly drain all fuel from the fuel tank, lines, and the fuel filter/water separator assembly.
7. Flush the fuel tank with fresh, clean diesel fuel.
8. Secure all fuel system fittings.
9. Thoroughly clean and service the air cleaner assembly.
10. Seal the air cleaner inlet and the exhaust outlet with weatherproof tape.
11. Check the antifreeze protection and add as needed for expected minimum temperature in your area.

Troubleshooting

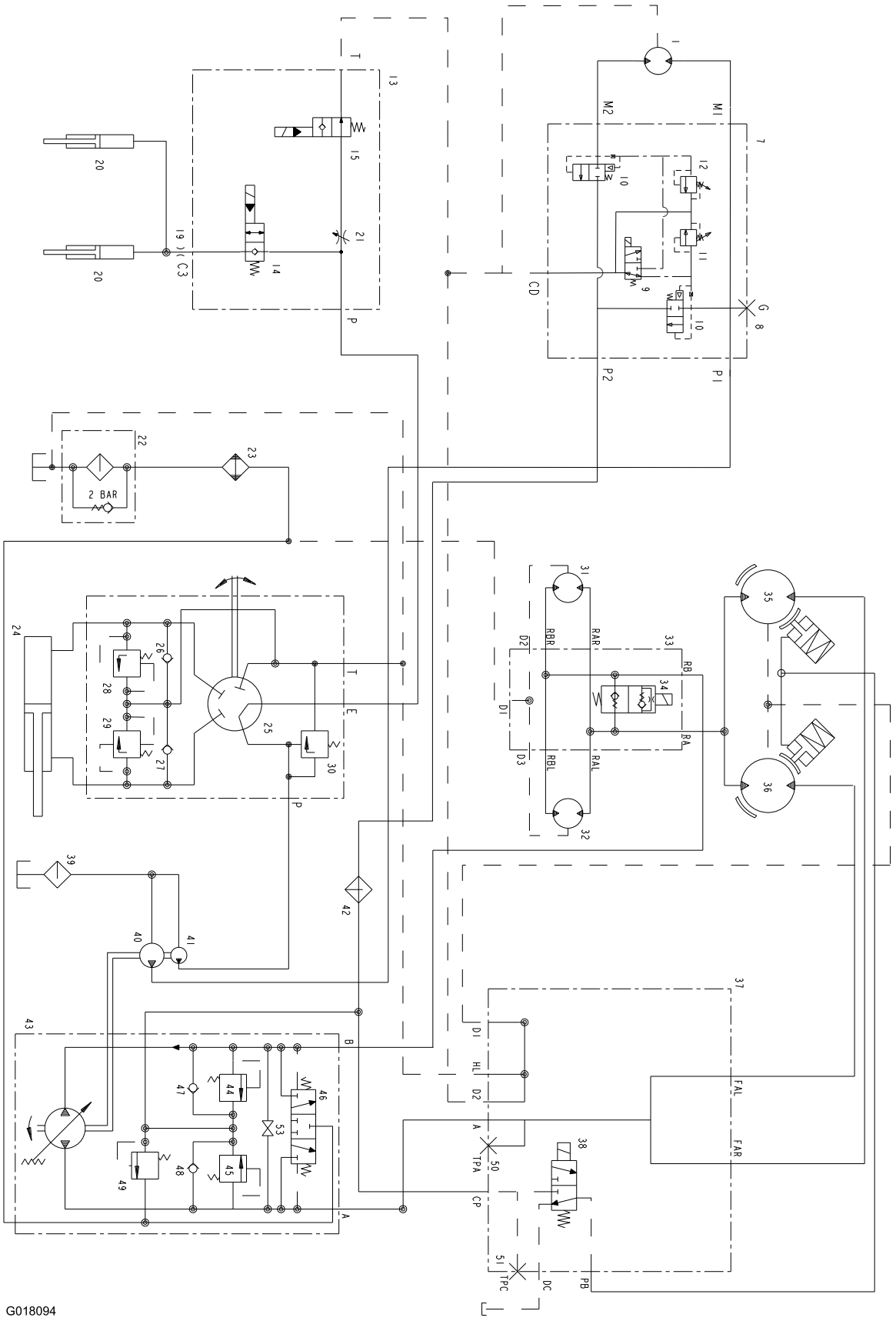
Problem	Possible Cause	Corrective Action
Engine will not start with ignition key	1. Transmission neutral interlock switch not energized	1. Remove foot from forward/reverse pedals or Check setting of transmission neutral interlock switch
	2. Parking brake interlock switch not energized	2. Operate parking brake lever to the ON position
	3. Cutting unit drive interlock switch not energized	3. Check setting of parking brake interlock switch
	4. Faulty electrical connection	4. Trace and correct fault
Flat battery	1. Terminal connection loose or corroded	1. Clean and tighten terminal connections. Recharge battery
	2. Loose or defective alternator belt	2. Adjust tension or replace drive belt, refer to Engine Operators Manual
	3. Defective battery	3. Charge battery or replace batter
	4. Electrical short circuit	4. Trace short circuit and fix
Hydraulic oil system overheating	1. Blocked radiator	1. Clean screen
	2. Blocked oil cooler fins	2. Clean fins
	3. Blocked engine radiator matrix	3. Clean matrix
	4. Low relief valve setting	4. Have relief valve cleaned and pressure checked. Consult your authorized dealer
	5. Low oil level	5. Fill reservoir to correct level
	6. Brakes engaged	6. Disengage brakes
	7. Defective fan or fan drive	7. Check fan operation and service required
Incorrect brake operation	1. Faulty wheel motor brake assembly	1. Consult your authorized dealer
	2. Worn brake discs	2. Replace brake discs Consult your authorized dealer
Lack of steering	1. Defective steering valve	1. Service or replace steering valve
	2. Defective hydraulic cylinder	2. Service or replace hydraulic cylinder
	3. Damaged steering hose	3. Replace defective hose
No machine movement forward or reverse	1. Parking brake engaged	1. Release parking brake
	2. Low oil level	2. Fill reservoir to correct level
	3. Incorrect oil used	3. Drain reservoir and refill with correct oil
	4. Damaged drive pedal linkage	4. Check linkage and replace defective parts
	5. Damaged transmission pump	5. Have the transmission pump overhauled by your authorized dealer
	6. Transmission relief valve open	6. Close relief valve
	7. Broken drive coupling	7. Replace drive coupling
	8. Transmission filter blocked	8. Replace transmission filter
Forward/backward transmission creep in neutral	1. Transmission neutral adjustment incorrectly set	1. Adjust transmission neutral linkage setting

Problem	Possible Cause	Corrective Action
Excessive noise in hydraulic system	1. Faulty pump	1. Identify noisy pump and service or replace
	2. Faulty motor	2. Identify noisy motor and service or replace
	3. Air leaking into system	3. Tighten or replace hydraulic fittings particularly in suction lines
	4. Suction strainer blocked or damaged	4. Clean and replace suction strainer or renew as necessary
	5. Excessive oil viscosity due to cold conditions	5. Allow system to warm up
	6. Low relief valve setting	6. Have relief valve cleaned and pressure checked. Consult your authorized dealer
	7. Low hydraulic oil level	7. Fill hydraulic oil reservoir to correct level
After initial satisfactory operation machine loses power	1. Worn pump or motor	1. Replace as necessary
	2. Low hydraulic oil level	2. Fill hydraulic oil tank to correct level
	3. Incorrect oil viscosity	3. Replace oil in hydraulic tank with correct viscosity grade oil
	4. Oil filter element blocked	4. Change filter element
	5. Faulty pressure relief valve	5. Have relief valve cleaned and pressure checked. Consult your authorized dealer
	6. Overheating	6. Reduce work rate i.e. increase height of cut or reduce forward speed
	7. Leaks on suction hose	7. Check and tighten fittings. Replace hose if necessary.
Cutting unit fails to lift out of work	1. Lift cylinder seal failure	1. Replace seals
	2. Pressure relief valve jammed open or wrongly set	2. Have relief valve cleaned and pressure checked. Consult your authorized dealer
	3. Defective control valve	3. Overhaul control valve
	4. Mechanical blockage	4. Remove blockage
Cutting unit does not follow ground contours	1. Tightness in pivots	1. Release and grease as necessary
	2. Mower operated in ‘hold’ position	2. Move position control switch to ‘down / float’ position
	3. Weight transfer set too high	3. Reduce weight transfer
Cutting unit fails to start up	1. Faulty seat sensor switch	1. Check mechanical and electrical operation of switch
	2. Low oil level	2. Fill hydraulic oil reservoir to correct level
	3. Sheared drive shaft	3. Check motor and cylinder drive shafts and replace if necessary
	4. Pressure relief valve jammed open or wrongly set	4. Have relief valve cleaned and pressure checked. Consult your authorized dealer
	5. Cutting unit blade (s)jammed	5. Clear as necessary
	6. Cutting unit control valve in the ‘off’ position caused by defective control valve	6. Overhaul control valve
	7. Cutting unit control valve in the ‘off’ position caused by electrical fault	7. Have electrical system checked
Blades rotate in wrong direction	1. Hoses connected wrong	1. Check hydraulic circuit and reconnect as necessary

Schematics



Electrical Schematic (Rev. A)


2 BAR
G018094

Item Number	Description
1	Hydraulic motor
7	Cutter control manifold
8	Test Port - Cutter Pressure
9	Valve Solenoid
10	Element Logic
11	Pressure relief valve 230 bar
12	Pressure relief valve 41 bar
13	Lift control manifold
14	Solenoid valve
15	Solenoid valve
19	Orifice Fitting 2.0mm
20	Lift Cylinder
21	Weight transfer valve
22	Return filter
23	Oil cooler
24	Steering cylinder
25	Steering unit
26	Check valve steering shock bypass LH
27	Check valve steering shock bypass RH
28	Relief valve 183 bar steering shock bypass LH
29	Relief valve 183 bar steering shock bypass RH
30	Pressure relief valve 115 bar
31	Hydraulic motor - LH rear wheel
32	Hydraulic motor - RH rear wheel
33	Rear transmission manifold
34	Solenoid valve - fwd reverse check valve 4wd
35	Hydraulic motor - LH front wheel
36	Hydraulic motor - RH front wheel
37	Front transmission manifold
38	Solenoid valve - parking brake
39	Suction strainer
40	Gear pump - cutting unit drive
41	Gear pump - lift & steer
42	Pressure filter
43	Transmission pump
44	Pressure relief valve reverse travel 300 bar
45	Pressure relief valve forward travel 300 bar
46	Purge valve
47	Check valve transmission reverse bypass
48	Check valve transmission forward bypass
49	Pressure relief valve - charge pressure bar

50	Test port - transmission pressure - forward
51	Test port - charge pressure
53	Transmission bypass valve

Hydraulic Schematic and Key (Rev. A)

Notes:

Notes:

Intl Dist List

Distributor:	Country:	Phone Number:
Atlantis Su ve Sulama Sisstemleri Lt	Turkey	90 216 344 86 74
Balama Prima Engineering Equip.	Hong Kong	852 2155 2163
B-Ray Corporation	Korea	82 32 551 2076
Casco Sales Company	Puerto Rico	787 788 8383
Ceres S.A.	Costa Rica	506 239 1138
CSSC Turf Equipment (pvt) Ltd.	Sri Lanka	94 11 2746100
Cyril Johnston & Co.	Northern Ireland	44 2890 813 121
Equiver	Mexico	52 55 539 95444
Femco S.A.	Guatemala	502 442 3277
G.Y.K. Company Ltd.	Japan	81 726 325 861
Geomechaniki of Athens	Greece	30 10 935 0054
Guandong Golden Star	China	86 20 876 51338
Hako Ground and Garden	Sweden	46 35 10 0000
Hako Ground and Garden	Norway	47 22 90 7760
Hayter Limited (U.K.)	United Kingdom	44 1279 723 444
Hydroturf Int. Co Dubai	United Arab Emirates	97 14 347 9479
Hydroturf Egypt LLC	Egypt	202 519 4308
Ibea S.P.A.	Italy	39 0331 853611
Irriamc	Portugal	351 21 238 8260
Irrigation Products Int'l Pvt Ltd.	India	86 22 83960789
Jean Heybroek b.v.	Netherlands	31 30 639 4611
Maquiver S.A.	Colombia	57 1 236 4079
Maruyama Mfg. Co. Inc.	Japan	81 3 3252 2285
Metra Kft	Hungary	36 1 326 3880
Mountfield a.s.	Czech Republic	420 255 704 220
Munditol S.A.	Argentina	54 11 4 821 9999
Oslinger Turf Equipment SA	Ecuador	593 4 239 6970
Oy Hako Ground and Garden Ab	Finland	358 987 00733
Parkland Products Ltd.	New Zealand	64 3 34 93760
Prochaska & Cie	Austria	43 1 278 5100
RT Cohen 2004 Ltd.	Israel	972 986 17979
Riversa	Spain	34 9 52 83 7500
Sc Svend Carlsen A/S	Denmark	45 66 109 200
Solvert S.A.S.	France	33 1 30 81 77 00
Spypros Stavrinides Limited	Cyprus	357 22 434131
Surge Systems India Limited	India	91 1 292299901
T-Markt Logistics Ltd.	Hungary	36 26 525 500
Toro Australia	Australia	61 3 9580 7355
Toro Europe NV	Belgium	32 14 562 960

The Toro Total Coverage Guarantee

A Limited Warranty

Conditions and Products Covered

The Toro® Company and its affiliate, Toro Warranty Company, pursuant to an agreement between them, jointly warrant your Toro Commercial product ("Product") to be free from defects in materials or workmanship for two years or 1500 operational hours*, whichever occurs first. This warranty is applicable to all products with the exception of Aerators (refer to separate warranty statements for these products). Where a warrantable condition exists, we will repair the Product at no cost to you including diagnostics, labor, parts, and transportation. This warranty begins on the date the Product is delivered to the original retail purchaser.
* Product equipped with an hour meter.

Instructions for Obtaining Warranty Service

You are responsible for notifying the Commercial Products Distributor or Authorized Commercial Products Dealer from whom you purchased the Product as soon as you believe a warrantable condition exists. If you need help locating a Commercial Products Distributor or Authorized Dealer, or if you have questions regarding your warranty rights or responsibilities, you may contact us at:

Commercial Products Service Department
Toro Warranty Company
8111 Lyndale Avenue South
Bloomington, MN 55420-1196
E-mail: commercial.warranty@toro.com

Owner Responsibilities

As the Product owner, you are responsible for required maintenance and adjustments stated in your Operator's Manual. Failure to perform required maintenance and adjustments can be grounds for disallowing a warranty claim.

Items and Conditions Not Covered

Not all product failures or malfunctions that occur during the warranty period are defects in materials or workmanship. This warranty does not cover the following:

- Product failures which result from the use of non-Toro replacement parts, or from installation and use of add-on, or modified non-Toro branded accessories and products. A separate warranty may be provided by the manufacturer of these items.
- Product failures which result from failure to perform recommended maintenance and/or adjustments. Failure to properly maintain your Toro product per the Recommended Maintenance listed in the *Operator's Manual* can result in claims for warranty being denied.
- Product failures which result from operating the Product in an abusive, negligent or reckless manner.
- Parts subject to consumption through use unless found to be defective. Examples of parts which are consumed, or used up, during normal Product operation include, but are not limited to, brakes pads and linings, clutch linings, blades, reels, bed knives, tines, castor wheels, tires, filters, belts, and certain sprayer components such as diaphragms, nozzles, and check valves, etc.
- Failures caused by outside influence. Items considered to be outside influence include, but are not limited to, weather, storage practices, contamination, use of unapproved coolants, lubricants, additives, fertilizers, water, or chemicals, etc.
- Normal noise, vibration, wear and tear, and deterioration.
- Normal "wear and tear" includes, but is not limited to, damage to seats due to wear or abrasion, worn painted surfaces, scratched decals or windows, etc.

Parts

Parts scheduled for replacement as required maintenance are warranted for the period of time up to the scheduled replacement time for that part. Parts replaced under this warranty are covered for the duration of the original product warranty and become the property of Toro. Toro will make the final decision whether to repair any existing part or assembly or replace it. Toro may use remanufactured parts for warranty repairs.

Note Regarding Deep Cycle Battery Warranty:

Deep cycle batteries have a specified total number of kilowatt-hours they can deliver during their lifetime. Operating, recharging, and maintenance techniques can extend or reduce total battery life. As the batteries in this product are consumed, the amount of useful work between charging intervals will slowly decrease until the battery is completely worn out. Replacement of worn out batteries, due to normal consumption, is the responsibility of the product owner. Battery replacement may be required during the normal product warranty period at owner's expense.

Maintenance is at Owner's Expense

Engine tune-up, lubrication cleaning and polishing, replacement of Items and Conditions Not Covered filters, coolant, and completing Recommended Maintenance are some of the normal services Toro products require that are at the owner's expense.

General Conditions

Repair by an Authorized Toro Distributor or Dealer is your sole remedy under this warranty.

Neither The Toro Company nor Toro Warranty Company is liable for indirect, incidental or consequential damages in connection with the use of the Toro Products covered by this warranty, including any cost or expense of providing substitute equipment or service during reasonable periods of malfunction or non-use pending completion of repairs under this warranty. Except for the Emissions warranty referenced below, if applicable, there is no other express warranty.

All implied warranties of merchantability and fitness for use are limited to the duration of this express warranty. Some states do not allow exclusions of incidental or consequential damages, or limitations on how long an implied warranty lasts, so the above exclusions and limitations may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Countries Other than the United States or Canada

Customers should contact their Toro Distributor (Dealer) to obtain guarantee policies for your country, province, or state. If for any reason you are dissatisfied with your Distributor's service or have difficulty obtaining guarantee information, contact the Toro importer. If all other remedies fail, you may contact us at Toro Warranty Company.